



AGRICULTURAL RESEARCH INSTITUTE
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PRIZE-ESSAYS

TRANSACTIONS

HIGHLAND SOCIETY OF SCOTLAND.

NEW SERIES.

VOL. III.

**WILLIAM BLACKWOOD, EDINBURGH; AND
T. CADELL, STRAND, LONDON.**

MDCCCXXXII.

NEILL & CO. PRINTERS,
Old Fishmarket, Edinburgh.

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PRIZE ESSAYS AND TRANSACTIONS

OF

THE HIGHLAND SOCIETY OF SCOTLAND.

PRELIMINARY NOTICE.

WITHIN the limited period of eighteen months which has elapsed since the date of the preliminary notice prefixed to the Eighth Volume, the affairs of the Society have been eminently prosperous : 120 new members have been added to the list, which, as published in January last, and corrected up to that time, comprehends 1771 noblemen and gentlemen.

The list of premiums offered for 1830, given, as usual, as an appendix to the Number of the Transactions published last May, and the list for 1831, which will be appended to the present Number, sufficiently show the varied character of these premiums, as well as their increase and extension, and, consequently, render it unnecessary here to advert to them in detail.

While the District Shows of Live Stock have been continued as before within the period to which this notice refers, the General Shows have been held at Perth and Dumfries with increasing interest. An unusual assemblage of those in-

terested in agricultural pursuits appeared in the show-yards, and on each occasion above 400 noblemen and gentlemen attended the meetings held at the conclusion of the business. The meeting for the present year is to be held at Inverness, with the best anticipations, and that for 1832 at Kelso, in pursuance of an application made to the Society by many of the principal proprietors and tenants of the south-eastern districts of Scotland. A wish having been generally expressed that stock from England should be included in the arrangement of the premiums for the Kelso meeting, the Society has acceded to the suggestion. The competition is open to stock from any part of Great Britain, and it is accordingly expected that an opportunity will thus be afforded to agriculturists in Scotland, which they have never before enjoyed, of comparing their stock with some of the most celebrated breeds of England.

The Committee of the Society charged with superintending the preparation of Designs for Farm Buildings from the various plans for which premiums have been awarded, have completed the duty assigned to them. A series of designs applicable to the different classes of farms was published in the Number of the Transactions for February last.

The subject of improving the communication from London to the north having been brought before the general meeting of the Society, in July 1830, resolutions were adopted in favour of the measure, which were transmitted to certain members of his Majesty's Government, and of which copies were also sent to the several Peers and Members of Parliament connected with Scotland.

The Veterinary School continues to prosper: 26 students attended the last session, with the intention of ultimately commencing practice in different districts. Certificates are issued to those who attend two sessions, and afterwards pass the pre-

scribed examinations before the Committee of Medical Examinators. The lectures during the present session (1830-31) being still in progress, the annual report for this course has not yet been made; but it may be satisfactory to present some details from the report of last year, submitted by the Society's Committee on the School, through Mr Fergusson of Woodhill, their chairman, to whose unwearied attention the Veterinary School owes so much. The report does justice to the talents of the zealous and intelligent lecturer, Mr Dick, and states that the seventh session was attended by 26 individuals, that the course was extended to 70 lectures, in which the osteology, muscles, tendons, the foot, the organs of respiration, the abdominal viscera, the urinary and generative organs, the skin, the brain, the nerves, the ear, and the eye, were described, as well as the various diseases to which these parts are liable. The students throughout enjoyed the advantage of regular anatomical demonstration, practical operations, and clinical treatment of patients, for which latter purpose a stable was provided. Seven candidates passed their trials this season, and the Edinburgh school has been recognized in a kindly and liberal manner by the leading veterinarians in England.

A wish having been expressed that the Society should place in its museum a collection of models of all the improved implements of agriculture in common use in Scotland, the matter was remitted to the consideration of the Committee, upon whose report the suggestion was adopted. The object chiefly in view is to afford to distinguished strangers who may visit Scotland, as well as to agriculturists from different parts of the country, an opportunity of seeing collected together the various implements adopted in Scottish farm management.

Preparatory to carrying the suggestion into effect, the Committee prepared a list of the instruments of which models might be necessary for the purpose in view, and in order that the list

might be rendered as complete as possible, the Society directed a copy of it to be transmitted to the different local agricultural associations in Scotland, whose suggestions are always so valuable in every measure bearing reference to the practical details of farming. The local associations have been invited to take the trouble of favouring the Society's Committee with their suggestions on the list, more particularly with reference to any implements in general use in their respective districts, which may either not be included in the skeleton list transmitted to them, or which they may think of a more improved or convenient form. With reference to any implements of either description which the members of the different local societies may recommend, they have been requested, for the public purpose in view, to do the Highland Society the favour of transmitting a model or drawing of such machines, adapted to a definite scale, and which, if a model, will be deposited in the museum.

Various papers in the former Volumes shew the exertions the Society has made to promote the improvement of the manufacture of kelp, as a means of enabling the proprietors in various remote and insular districts of the Highlands to improve their estates; and, by affording employment to the inhabitants, to raise the peasantry from a state of penury to comparative activity and comfort. For a long period, the manufacture had been encouraged by protecting duties, but of late years a series of legislative enactments, reducing the duty on barilla, have gone far to undo all the measures by which the kelp manufacture had been previously fostered. The duty on barilla imported was latterly reduced to L. 5 a-ton, the lowest point of protection at which the manufacture of kelp could be continued with any profit. Government having recently resolved still farther to lower the duty from L. 5 to L. 2 the ton, a representation was made to the Society by the kelp proprietors at the anniversary meeting in January

last, stating the alarming consequences which must result, should the proposed reduction be carried into effect, and requesting the Society's support in a representation to Government. The Society submitted an urgent memorial to the Treasury, representing to the Board the Society's great apprehension of the consequences of any measure which might throw out of employment the numerous population dependent on the kelp manufacture.

In the hope of opening a new channel for the consumption of kelp, it will be observed from the list of premiums, that the Society has offered several to promote experiments on the use of kelp as a manure in raising various crops.

At the anniversary meeting in January last, his Grace the Duke of Hamilton and Brandon retired from the office of president, having filled the chair during four years, the period limited by the charter and bye-laws. The Noble Duke, in taking leave of the chair, made a very appropriate address to the Society, and took a review of the proceedings during the last four years. In the papers and reports which have from time to time been published in these volumes, several matters to which his Grace alluded, have been anticipated, and it is of course unnecessary to revert to them; but one or two of the topics on which the Duke touched may be briefly noticed. "Filling," said his Grace, "the situation I now do, I cannot retire from it without expressing the sense I entertain of that honourable station, and, at the same time, my best acknowledgments for your indulgent consideration on those occasions, when circumstances precluded me from giving all the attention to its duties which I could have wished. Preparatory to the election of a successor, I may be permitted to advert to some circumstances connected with the Society's business during the time I have been in this chair. And, first, I may remark on the advantageous situation in which the Society stands; it has always been prosperous—but without taking any merit to myself, it has been particularly so during

the last four years. By the economy and prudence of its management, notwithstanding the low rate of interest, its pecuniary means have increased, while it has extended its beneficial influence over the country. I had the honour of proposing to the Society to carry its great annual Cattle Show to different parts of the country. The result has been more than successful, and essential benefit has followed to agriculture. These meetings have connected one part of the country with another, and afforded the means of comparing the circumstances of one with those of another. The District Local Meetings have been alike beneficial. These meetings, although more limited in their sphere of operation, are always productive of useful results.

“Within the same period also, the publication of the Transactions of the Society has assumed a new shape, by having been embodied in the regular form of a quarterly publication. Many improvements are in this way immediately made known to the agricultural community, which must prove highly beneficial.

“Speaking of publications, there is another which has been highly honourable to us, the Gaelic Dictionary—a work undertaken in 1814, and completed in 1828, without in the smallest degree interfering with our regular business. I must congratulate the Society in accomplishing this work, before the means of doing so had departed for ever. It is a work interesting to the public, and more especially to the philologist and antiquary, as showing how, by natural ties and affinities, the language of one part of the country is connected with that of the other.”

Having taken a review of various other matters which had occupied the attention of the Society during the period he filled the chair, his Grace concluded his address, by proposing that the Duke of Buccleuch and Queensberry, one of the vice-presidents, should be elected to the chair, a proposal which met the unanimous approbation of the Society. His

Grace accordingly took the chair, amidst the general applause of the meeting. A resolution of thanks was thereupon voted to the Duke of Hamilton, for his Grace's uniform attention to the business of the Society, during the time he had been at its head.

In a preliminary notice to be prefixed to a volume of the Society's Transactions, it cannot be out of place to mention, that, within the period to which that notice refers, the Society has lost one of its most zealous members, Mr Henry Mackenzie, one of those who co-operated in its first formation, in 1783-4. Only fourteen of these fathers of the Society now survive. From the institution down to the latest period that his health permitted, Mr Mackenzie afforded to the Society the advantage of his eminent talents, and devoted to its affairs no small share of his valuable time. He superintended the publication of several of the volumes of its Transactions; and, as chairman of a Committee on the Ancient Literature and Antiquities of the country, he arranged for the press the evidence which that Committee had collected relating to Ossian's Poems—a publication which, at the time, excited much notice. As chairman of the Committee, in the same department, he also took an active charge in superintending the compilation and publication of the *Scoto-Gaelic Dictionary*, the work with which the labours of that Committee terminated. Mr Mackenzie died in January last, and the Directors took the earliest opportunity of entering on the records the expression of the grateful sense which they entertained of his valuable services to the Society, and their deep regret for the loss of so distinguished a member:

HIGHLAND SOCIETY HALL, EDINBURGH, }
4th April 1831.

ESSAYS ON THE DISEASE IN CATTLE KNOWN BY THE NAMES
OF RED-WATER, BLACK-WATER, OR MOOR-ILL.

In the year 1830, the Society offered a premium for the best Essay on the causes, prevention, and cure, of the disease in cattle called the Red-Water or Moor-ill, it being required that the essay should advert to the description of cattle most liable to be attacked by it, the season of the year at which it usually appears, the kind of food most likely to produce it, and the morbid appearances disclosed by dissection. Several essays have been received, each of which is here presented in a more or less abridged form. It will be seen that various causes are given for the disease, although most of the writers agree in thinking acrid or otherwise unwholesome food the principal remote cause. Next to the discoloration of the urine, the most prominent feature of the disease consists in extreme constipation; and dissection exhibits an extraordinary dryness of the contents of the third stomach, and a great contraction or obstruction of that organ. The treatment recommended is purgation, together with the administration of various remedies, suited to the secondary or adventitious symptoms. Owing to its prevalence in certain districts, its rare occurrence in others, and its recent appearance in parts previously free of it, this disease is peculiarly deserving of investigation. Several of the writers attribute it to acrid plants; and as this opinion is the most probable, a series of experiments on the effects of some of these plants which usually occur in pastures or woodlands, such as *Ranunculus acris*, *R. Flammula*, and *Anemone nemorosa*, would be of the greatest importance in elucidating the disease in question. The variety of the disorder which occurs in newly calved cows appears to depend

upon a change in the food about the period of parturition, but post-mortem appearances have not yet been sufficiently observed.]

I. ESSAY ON THE DISEASE CALLED RED-WATER. *By Mr ROBERT THOMSON, Auchterarder.*

THE disease commonly called *Red-Water*, *Brown-Water*, *Black-Water*, *Moor-Ill*, &c. is most prevalent in old foggy pastures. It is seldom seen in hill pastures, or in new sown pastures, in which there is abundance of clover; but it sometimes happens at the stall, where the animal has no other allowance than straw, turnips, and potatoes. It usually makes its appearance after a few days of rain, followed by cold dry weather. As the disease appears at times in all situations, it is difficult to trace its cause, which may be the nature of the pasture, or the state of the weather, or both combined. It attacks every breed and kind of cattle introduced into this part of the country, although there is plenty of excellent water in the pastures.

The first symptom is the appearance of something like blood mixed with the urine. So trifling is the complaint in some instances, that no inconvenience seems to be felt by the animal, which eats and drinks as usual, chews the cud, and is free of the disease in a few days. In such cases, a natural diarrhoea comes on, to which the cure may be attributed. In general, however, the disease is not observed until the animal refuses food, separates from the rest of the herd, appears dull and heavy, and manifests great languor and apathy. The ears droop, the urine is of a reddish or brownish colour, and if it be a milch cow, the milk is often similarly tinged. The pulse ranges from 60 to 70; there is obstinate constipation of the bowels; the urine is discharged in moderate quantity, and apparently without pain. If relief is not afforded by some brisk purgative, at the period when the urine changes

colour from red to brown, the pulse begins to sink, and if a little blood be drawn at this time, its surface assumes a brownish colour; the eye appears of a yellowish brown tint; the urine acquires a darker hue; the animal refuses to rise; the pulse sinks; the legs, tail, and horns, turn cold; and the animal dies, to all appearance perfectly exhausted, although it has manifested no symptoms of acute pain during the course of the disease.

On removing the skin in animals which have died of this disease, the subjacent parts have a peculiar dark yellow appearance. The abdominal fat has the same colour. The first and second stomach are generally pretty full of food. The third stomach, or manyplies, is dry; its rugæ are inflamed; its contents compressed as by general spasm. The fourth, or true stomach, is nearly empty; its gastric juice tinged of a dark yellow colour. The small intestines show no marks of inflammation, but their mucous coat is tinged of the same colour. The rectum contains indurated fæces, covered by brownish slime. The liver is of a darker colour than natural, but does not appear to be diseased in structure. The gall-bladder, in all cases that I have seen, is full of black, thick bile, somewhat resembling lamp-black and oil. The ductus communis choledochus does not appear to be obstructed, or if it is, this is effected by the presence of the neighbouring viscera. The fat surrounding the kidneys is healthy, but of a dark yellow tint. The kidney shews no appearance of disease, and, on being compressed, emits a few drops of urine similar to that in the bladder. The latter organ is healthy, but full of dark-coloured urine, resembling the thinner parts of the contents of the gall-bladder. There is no accumulation of fluid in the cavity of the peritonæum. The thoracic viscera are healthy, but tinged with yellow, as are the liquor pericardii, and the cerebral fluid. The contents of the lacteals and thoracic duct are of a dark-brown colour.

From the above appearances, the third stomach might seem diseased, but if water or liquid drinks be given plentifully before death, this appearance of dryness of the contents and inflammation will not take place. We must, therefore, seek the cause elsewhere. The kidneys are healthy, but the urine is tinged brown. The whole secretions are also more or less tinged. Shall we suppose, then, that the whole apparatus of secretion is diseased, or that the absorption of black inspissated bile into the blood colours all the secretions, as jaundice does in the human subject? This seems the most reasonable supposition. Bile regurgitated into the substance of the liver, can be taken up by the absorbents and passed into the blood, causing derangement of the functions of secretion, and giving a red appearance to the urine, milk, &c. If constipation of the bowels be present, the bile may be taken up by the absorbents of the mesentery, and introduced into the circulation; and, if continued for some time, the whole blood will become poisoned as it were, and unfit for the support of animal life, although there is no appearance of mortification in any part of the system, but all the secretions, together with the fat, are more or less tinged with a dark-brown or yellow colour.

Purgatives of any kind, if given in large quantities of water, are found to be the best medicines that can be employed. Medicines given to cattle that have lost the power of chewing the cud, generally pass into the first and second stomachs, and if a good draught of water is not given to wash them from thence, if the animal dies the greater part of the medicines will be found in these stomachs; and upon this principle, common salt, if properly managed, will be found among the best. Dissolve the quantity to be given in as much water as will enable it to pass freely from the bottle or drenching horn, and let the animal have plenty of water to drink afterwards. Should it refuse to drink, no time should be lost in drenching it profusely with water. Without a plenti-

ful dilution, there is no certainty of purging cattle that have lost their cud. If purging does not commence in from twelve to twenty-four hours, a second dose should be given. Injections of soap and water should also be tried if the case is obstinate, and when they operate, a pint of linseed oil should be given as a laxative. So obstinate is the constipation in some cases, that the salt acts only as a diuretic, causing a plentiful discharge of urine. Diuretics and astringents combined seem only of service when the bowels are open, and their improper administration often causes inflammation of the bowels and kidneys. If, after purgation, the bowels are kept open by laxatives, such as linseed infusion, the disease will gradually disappear without their use. In the last stage of the disease, when the urine assumes a dark-brown or black colour, no remedy seems to have any efficacy, the animal is sunk beyond recovery, the bowels lose their action, suppression of urine follows, the animal stretches itself out and dies, as if perfectly exhausted.

It is the duty of the owner, then, to attend to the disease at its commencement, and pursue a determined course of practice. Whether the disorder be owing to absorbed inspissated bile, diseased manyplies, or disease of the secerning glands, purgatives of any kind, profusely diluted with water, almost always effect a cure. But if reliance be placed upon recipes in books of farriery, or the quackeries of ignorant pretenders, the owner will often find himself cruelly disappointed.

There are two diseases which in their symptoms bear some resemblance to moor-ill in cattle, viz. inflammation of the kidneys, and inflammation of the mucous membrane of the bladder or urethra, which often happens at calving. In this case, the urine, which is discharged with pain, is mixed with blood, but not so intimately so as the coloured urine in moor-ill, and has generally more or less mucus mixed with it. Inflammation of the kidneys in cattle is comparatively rare. I have seen only one well marked case, which terminated fatally.

The animal experienced considerable pain upon pressure being applied to the region of the kidneys. The urine was small in quantity, and nearly as thick as blood; the pulse 90 and very hard. As the disease advanced, the urine became black and fetid. The animal all along exhibited symptoms of excruciating pain, until death terminated its sufferings. Post-mortem examination disclosed extensive inflammation of the peritonæum. The abdominal cavity contained a large quantity of dark-coloured fetid fluid; the fat surrounding the kidneys, as well as the kidneys themselves, was in part gangrenous; and the fat generally exhibited a yellow colour, as is usual in cases where death terminates inflammatory diseases.

II.—ESSAY ON THE DISEASE IN CATTLE COMMONLY KNOWN BY THE NAME OF RED-WATER. *By Mr WILLIAM LAING, Veterinary Surgeon, Banchory-Ternan, Aberdeenshire.*

HAVING practised for a considerable time as a Veterinary Surgeon in the districts of Aberdeen and Kincardine, where Red-Water has been very prevalent, I trust the following observations on that disease may not prove altogether unworthy of notice.

Causes.—I am led to infer that close confinement in winter is one predominating cause, the cattle being thus deprived of the necessary exercise, fresh air, and access to *earth*, which seems to be useful in correcting the acidity produced in the stomach by costiveness and obstructed bile. Withholding turnips from cows for a number of days previous to calving, has also an evident tendency to bring on the disease, by causing costiveness, and thereby stopping or vitiating the

bile. Frosty water is also another cause, as it tends to produce indigestion, bad chyle, and consequently bad blood. The disease may also be induced or encouraged by difficult calving. Barley chaff given in its natural state, but more particularly when boiled, may also occasion it, by destroying the sensibility of the villous coats of the stomach.

Season at which the disease appears.—It occurs most frequently in the end of autumn, in winter, and more particularly in the early part of spring. It occurs also, though less frequently, in the summer season, and is then named the *Darn*.

Kinds of Cattle liable to be affected.—In the course of my practice, I have had occasion to see cattle of various kinds affected by the disease, nor do I think that any are exempted from it, although some are more liable than others, owing to the particular mode of treatment to which they are subjected. Cattle in the Highland districts are seldom attacked, which may depend upon the circumstances of their being naturally more hardy, and of their being allowed to roam at large, and drink spring instead of frosty water. Cows, towards the end of pregnancy, or after calving, are more liable than any other species of cattle.

Appearances on dissection.—After many minute and careful examinations, I can state the following as the usual morbid appearances. The effects of violent inflammation are clearly apparent; the tongue is much swelled, and of a blanched appearance; the œsophagus relaxed and whitish. The greater part of the inner coat of the ruminating stomach is completely destroyed; the second stomach has merely a whitish or bleached appearance; the third is much more affected, its inner coat adheres to the food in the act of separation, and all its parts are so dry as to be easily crumbled down between the fingers.

The fourth stomach is red and inflamed. The intestines are also partly inflamed. The thoracic viscera are sound. The liver, the internal lining of the ribs, the diaphragm and the stomach, are covered with bile. The liver itself is always completely rotten, the gall-bladder greatly distended with very thick bile, resembling the lees of train-oil. The kidneys are enlarged. The ureter and bladder seldom shew marks of disease. The uterus has undergone mortification in all its parts; and the vagina is always much swelled.

Prevention and cure.—To prevent this disease, cows should be allowed as much liberty as possible during the winter. I would strongly urge the necessity of bleeding, about three weeks previous to the time of calving, to the amount of from two to three quarts, according to the age, size and strength, of the cow. Next morning let a ball be given, composed of five drams of Barbadoes aloes, two drams of calomel, and of Castile soap as much as to render the ball sufficiently soft. The animal is to be supplied with plenty of spring water, but the food is to be less than usual, for at least forty-eight hours after the ball is given. Repeat the ball after seven days, and make no alteration in the food either immediately before or immediately after calving. In frosty weather, the turnips should be thawed before they are given to the cattle. No boiled food or grain should be given. A warm drink given after calving is useful in bringing off the placenta.

When a cow or stot is seized with this disorder, they ought to be bled immediately. If the cow has been bled previous to parturition, the quantity of blood taken must be less, but if not, three quarts or so may be taken. The following mixture should also be given, in the form of two balls: Barbadoes aloes ℥xij, colomel ℥ij, Castile soap, ℥i. A few bottles of linseed infusion may also be given immediately after the balls. Twelve hours after, give two ounces of Epsom salts, and two ounces of common salt, dissolved in one pint of cold

water. Should this not operate within twelve hours, administer a glyster of two gills of linseed-oil, broken in the yolk of an egg, and mixed with three pints of very thin oatmeal gruel. Give plenty of cold water the whole time. Cast up a little fresh earth, and lay before the animal. Present it with some sliced turnips, some greens, or a few potatoes or carrots, but above all, mangel-wurzel. If the physic does not operate in the course of thirty-six hours, give eight gills of linseed-oil, and two ounces of common salt dissolved in cold water. If the state of the cow at this period be dangerous, her back may be stimulated by a sinapism. In the space of a few hours after the physic has begun to operate, give the following drink, continuing it morning and evening until the water becomes clear: Acetate of lead $3\frac{1}{2}$, alum $3ij$, catechu $5ij$. Dissolve in one chopin of boiling water, and give when blood warm. Immediately after give two gills of vinegar mixed with a bottle of cold water. Under this treatment, a favourable issue may be expected.

III.—ESSAY ON THE RED WATER IN CATTLE. *By Dr* *JAMES BAYNE, Oatfield, Inverness.*

THE disease in cattle commonly called the *Red Water*, takes its name from the colour of the urine. By this, which is its most prominent symptom, it may readily be distinguished from every other complaint. It is attended with dulness and loathing of food, and the animal ceases to chew the cud. These symptoms invariably accompany, and generally precede, the appearance of the bloody urine. Sometimes there is a looseness, and the evacuations are occasionally tinged with blood; but costiveness usually prevails, and when the disease terminates fatally, it is frequently from this cause. Even in

the mildest form, there is a certain loss of condition; and when the disease is severe, and protracted beyond a few days, excessive debility and emaciation ensue, the effects of which are visible for a long time, and in some cases remain through life.

Cattle of all kinds and of all ages are subject to the complaint. Generally speaking, however, it is less dangerous and violent in young cattle. Two calves were this season attacked with it on this farm, and got well without the use of any remedy. It is, I think, most severe and obstinate in males. Bulls I have found particularly liable to it, as hardly one has escaped being at one time or other affected by it on this farm. It generally makes its appearance during the summer months, and in the beginning of autumn, sometimes later, but never, as far as my experience goes, in winter or spring.

Whatever the immediate cause of the complaint may be, I think it may be traced to something in the pasture. I have never known the disease to prevail except in particular situations, where woodland pasture abounded. On every farm of this description that I know, it more or less prevails. In such pasture, the common crowfoot*, a plant of a most acrid nature, generally abounds. All the land on this farm is infested by it: and to this circumstance I have been accustomed in a great measure to attribute the disease. Cattle reared upon the place are rarely affected, but strange cattle never escape.

There are a number of popular remedies, such as bleeding at the tail, dashing cold water on the back and flanks, common salt, butter-milk, &c. The plan of cure which I have for many years followed, and which I have never known to fail, is as follows. On the first appearance of the disease, the animal is confined to the house or yard. A large dose of

* Almost every species of Crowfoot is extremely acrid. Those most common in dry pastures are *Ranunculus bulbosus* and *acris*. In wet places, *R. Flammula* and *R. sceleratus* occur abundantly, especially the former. In woods, a plant of the same natural family, and possessed of similar properties, *Anemone nemorosa*, is usually abundant.—ED.

Glaubersalts, from $\frac{1}{2}$ lb. to $1\frac{1}{2}$ lb., according to the age and size, is immediately administered. The free use of water is allowed. If there is much appearance of fever, about a quart of blood is taken from the neck. If the disease does not yield to this treatment, and costiveness is present, frequent injections of warm water are administered. The best apparatus for this purpose is Read's patent syringe or stomach-pump. Any quantity can by means of it be thrown into the bowels,—I have frequently injected a pailful at a time. Even when the bowels are not in a very constipated state, and at the commencement of the disease, I have been in the habit of using the warm injections, and think they are of use as an internal fomentation. During the continuance of the disease, the animal should not be allowed to go out to pasture, and small quantities of cut grass from the clover field have been given.

I have never lost a beast on this farm by the disease, and have not had any opportunity of noting the morbid appearances on dissection. Some years ago, I had occasion to see a cow opened on a neighbouring farm, and so far as I can recollect, there was considerable inflammation of the internal coat of the stomach and intestines. The third stomach, in particular, was much inflamed, and so constipated, as to resemble a solid ball of dried dung.

IV.—ESSAY ON THE CAUSES, PREVENTION, AND CURE OF THE DISEASE IN CATTLE, KNOWN BY THE NAMES OF RED-WATER, BLACK-WATER, AND MOOR-ILL. *By Mr ANDREW HENDERSON, Land-Surveyor and Valuator, Gilmore Place, Edinburgh.*

THE disorder which forms the subject of the following remarks, although most commonly known by the name of *Red-*

Water, is also denominated, in different counties, *Moor-ill*, *Bloody Urine*, *Foul-Water*, and *Black-Water*; the latter name is applied to the last stage of the disease.

Black cattle of all kinds and ages are liable to this disease, but more particularly queys and cows. It occasionally prevails at all seasons, but more usually makes its appearance in cold spring or long continued dry summer weather. When observed in an early stage, it is easily cured, but if overlooked or neglected, it not unfrequently proves fatal.

Symptoms.—The first indication of the disease is afforded by repeated ineffectual attempts to void the urine, although small discharges of a brownish colour are observed. As the disease advances the urine assumes a higher tint, and at length acquires a bloody appearance. When large quantities of this highly coloured urine come away, the symptom is very unfavourable, particularly if accompanied by costiveness, as is not unfrequently the case. This may be called the third stage. If after this, the disease is not speedily removed by the use of proper means, it generally proves fatal, through debility, induced by too long a discharge of blood, or inflammation ending in mortification. The discharge at this period is very dark, on which account the disease is called *Black-Water*. When it is black and fetid, mortification has commenced; but when black without fœtor, the colour is caused by coagulated blood, the free passage of which generally induces more favourable symptoms. When first affected, the cattle have a dull sickly appearance. They raise their back a little at times, sometimes stand and cease from eating, or chewing the cud, but experience intervals of ease, when they rejoin the herd, and resume their feeding as if completely relieved. As the disease advances toward the third stage, or that of the bloody urine, the back is more raised, the tail extended, food is entirely rejected, the animal deserts its companions, and remains almost constantly in a state of suffering.

Should the first-mentioned indications of this disease be accompanied by trembling, cold clammy perspiration, alternations of heat, and violent pains across the loins, the animal shrinking when the hand is pressed against those parts, the disease may then be more strictly considered as inflammation of the kidneys, and will require different treatment.

Causes.—This disorder originates from various causes:—scarcity of water during long continued droughts in summer, change of pasture, the eating of acrid or prickly vegetables, or coarse food of any kind, the drinking of bad or stagnant water, taking cold by a sudden change of atmospheric temperature, or otherwise, and violent strains or bruises, which may excite inflammation in the kidneys or adjoining parts. It may appear strange, that the disease should originate from so many causes, but dissection invariably shews, that the discolouring of the urine is produced solely by inflammation in some of the internal parts; and it must be obvious to every one, that inflammation may be brought on in various ways.

When the disorder proceeds from any of the first four causes, the inflammation first takes place in the glands about the neck of the bladder. The small bloodvessels become ruptured; and should the disease not be cured in this stage, the blood coagulates and lodges about the neck of the bladder, giving the urine its darkest tinge. But when the disease originates from either of the two last-mentioned causes, the inflammation commences about the kidneys; and, although it produces similar external symptoms, requires different treatment.

Such being the internal state of the animal affected with Red-water, the various causes above mentioned will readily be admitted as capable of producing similar effects. But, as the most convincing proofs on this head are such as result from experience, I am induced to state what has come under my observation during the last twenty years. Having been

bred to farming in all its departments under my father, who had extensive grazing farms of various qualities, and having afterwards had similar charges myself for many years, I have enjoyed ample opportunities of observing the disease in all its forms. I have found that upon a light soil, liable to be soon burnt up for want of moisture, there would be ten attacks of the disease for one upon any of the neighbouring farms which might happen to have a deeper soil, and that the prevalence of the disease in such a situation was solely regulated by the state of the season ; for in a moist season not a single instance perhaps would occur, while in a dry one numerous cases would appear. I have also found that upon the same farm, when a few cattle were occasionally purchased from some neighbours possessing a farm of different herbage, one or more of them would occasionally be affected with the disease immediately after experiencing the change of pasture, and this more frequently when the change was from herbage of a fine to that of a coarse quality ; and this would repeatedly happen when the regular stock upon the farm was perfectly free from the disorder. These circumstances clearly prove that the disease may proceed from scarcity of water in a dry season, and that a change of pasture occasionally produces a similar effect.

If my experience had terminated here, I might have remained in the still prevailing opinion, that the disease is solely owing to one or other of these two causes. But having frequently, at an early period of life, had charge of some hundreds of different kinds of cattle, on their long journey from Scotland to the markets of the south of England, I have had numerous opportunities of witnessing the disease, a journey of this kind being seldom accomplished without the occurrence of many violent attacks. On these occasions, I have observed :

1. That twenty females for one male were attacked, and more especially such as had had calves.

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2. That at the commencement of the journey, the disease was not prevalent, provided there was a constant supply of water, and the weather proved steady.

3. That during a long-continued drought, the cattle were very subject to the disease, especially when pure water could not be had.

4. That sudden changes of weather were also apt to induce the disease.

5. That at the commencement of the journey, some of the cattle were generally affected, although no perceptible change had taken place in the quality of the food, and although the cattle had not been exposed to any of the above causes. This must have proceeded from inflammation induced by sprains, bruises, or over-heating, caused by the cattle fretting and riding upon each other, as well as by the unmerciful strokes of the drivers, as was clearly shewn by the circumstance that the cattle which generally fell behind on the journey, and were thus exposed to maltreatment, were those most frequently affected. These causes are such as induce the species of the disease already noticed as requiring different treatment.

From what has been stated, it would evidently appear that the Red-water in cattle is more an accidental disease, brought on in general by improper treatment, than either a constitutional or an epidemical one. This conclusion is strengthened by the circumstance, that cattle which are driven about from one place to another are invariably more subject to it than such as never have left home, or are allowed to remain for a time undisturbed in pastures. It is, however, an equally well known circumstance, that the disorder at times prevails even among undisturbed grazing stocks, when it proceeds from two unavoidable causes, the scarcity of water during a dry summer, and the sudden and repeated exposures to cold in a severe spring. But, although it would appear that the disease is not at all constitutional, yet some animals of the same breed

and age, and equally exposed to the same causes of disease, are more subject to it than others, and such as have once had the disease are more apt to be again affected by it.

Prevention.—Little requires to be said on this head, beyond strongly recommending particular attention in guarding against exposure to the causes assigned. Let the cattle be furnished with an abundant supply of pure water, and prevented from having recourse to water in a tainted state. When a change of pasture is necessary, if to that of inferior quality, let the cattle not be put into it when hungry, but after having eaten abundantly of grass of a superior quality, which will prevent them from eating acrid or prickly plants, and induce them to select the less injurious grasses. Pasturing in woods, and overstocking rough coarse pastures, particularly in summer, are very dangerous, as is feeding with heated hay or straw in winter. Cattle ought always to be provided with suitable shelter, to which they may have recourse when necessity requires. Should they have by any cause been overheated during the day, they ought not to be put into a damp cold pasture in the evening, but should be kept in some shed or warm situation, until they have cooled. Should cattle have received any violent sprains or bruises, particularly about the back or kidneys, they should immediately be bled. Indeed, when the disease commences in a stock, and one after another is affected, from whatever cause it may proceed, a little blood should be taken from the whole stock, particularly if in high condition. A strict adherence to the above directions will not only check the ravages of the disease, but will almost invariably exclude the necessity of having recourse to a cure.

Cure.—The general treatment of this disease, like that of all others, must vary in some measure on account of existing circumstances. Instead of detailing the often discordant practice of others, I shall here simply state the particulars of a method which I have successfully practised for a series of years.

For the First and Second Stages.—Immediately after the first symptoms have been noticed, the animal should be removed to some moderately warm, dry, and sheltered place, if in summer; but if in winter, or during cold weather, to a house. During the treatment, and even for some time after the cure has been effected, the animal should be supplied with good dry wholesome food, of easy digestion; but no description of food should be given for two hours before and after the administration of medicine. The first essential point to be ascertained is the cause of the disease, which may easily be done by comparing the state of the animal with the symptoms described above; and should inflammation of the kidneys be indicated, the treatment ought to be that described under the last stage. But if only the other symptoms appear, proceed as follows. First, a moderate quantity of blood ought to be taken, from two to three quarts, according to the age or constitution of the animal. Then give about half a pound of common salt dissolved in three quarts of butter-milk or water, and, if in summer, allow the animal free access to pure water, but if in winter or cold weather, the water must be warmed a little. Should the disorder not seem to abate in the course of a day, a dose of salts may be given, from three-fourths of a pound to a pound, which, with proper care, will generally prove successful. If the animal affected is a milch cow, the bleeding ought to be dispensed with, unless the other prescriptions prove ineffectual.

For the third stage.—Should the disorder not have been noticed until it has arrived at the third stage, or should the first attempts to cure have proved ineffectual, the animal must be very gently dealt with. Should symptoms of inflammation still continue, bleeding must be had recourse to, but sparingly. When the animal is much reduced, a repetition of the salts is not expedient, as they are apt to induce constipation, and by their irritation to increase the inflammation. A combination of cathartic and cordial medicines is to be used, so that the

inflammation may be subdued, while the system is not too much debilitated. The following drench will answer this purpose: Dissolve in a quart of hot ale or beer two ounces of Castile soap, one ounce of bole-armenic, half an ounce of dragon's blood, and one dram of roche-alum: Let them stand until lukewarm, and give them in one dose, which, if not effectual, may be repeated in about ten or twelve hours.

For the last stage.—The symptoms which indicate this stage may either proceed from neglect or mismanagement of the disease, or from inflammation of the kidneys, proceeding from cold or violent strains. When owing to the former causes, bleeding should on no account be attempted, but a repetition should be made of the drench recommended above. Should the animal be much reduced, it ought occasionally to have a cordial drink. When there is inflammation of the kidneys from the last-mentioned causes, and the febrile symptoms are not abated, bleeding must be repeated, although it may have been employed before, and although there may have been a considerable discharge of blood by the urine. The drench must also be repeated, and should costiveness appear, it should instantly be removed by the application of some lubricating glyster*. Should the heat and pain still continue across the loins, rub twice a-day with some emollient liniment†. When the disease abates, recourse may be had to cordial drinks, which are frequently necessary when a disease has been obstinate. The last-mentioned treatment, or that for inflammation of the kidneys, is that to be had recourse to at any stage, whether that disease exist by itself, or be combined with Red-water of the ordinary character.

* Boil half a pound of linseed in two quarts of water, and strain while hot; then add Glauber-salt and molasses, of each four ounces, and inject while lukewarm.

† Take oil of elder four ounces; spirit of turpentine and linseed oil, of each three ounces; water of pure ammonia, two ounces; opodeldoc and tincture of opium, each two ounces; mix and put in a bottle for use.

ESSAY ON RED-WATER IN CATTLE. *By Mr PETER SMITH, Veterinary Surgeon, Ardgethan, Alford, Aberdeenshire.*

- THIS dangerous and often fatal disease in recently calved cows, made its first appearance in this quarter only about twelve or fourteen years ago. It has been supposed by some to be brought on by the cows being now better fed in summer and winter, and in consequence too fat at the time of calving ; but the supposition does not appear well founded, for the keeping was as good in this place many years previous to its appearance, as it has been since, and lean cows are as liable to the disease as those in high condition.

Cows after calving are liable to it at all seasons of the year. It has been observed that those fed on farms of a deep loamy soil are very seldom affected by it, and that those which pasture on soils of a black irony kind, are particularly liable to the complaint. As the cows on soils of this last description were not liable to it before the land was improved, we may suppose the cause to be something in the quality of the artificial grasses, or the turnips, or both. The straw produced by this irony soil cannot produce it, as it was used before the disease was known.

The proximate cause of the disorder may be more satisfactorily accounted for. The calf, within the uterus, is enclosed in a bag, the placenta, which has on the outside a number of knots or suckers. These have corresponding secreting glands on the inside of the uterus. The suckers of the placenta absorb blood from the secreting glands, to be conveyed through the umbilical cord to the calf. In some cases, these absorbents and secretors are preternaturally enlarged, both in the placenta and uterus, the former coming off with the placenta soon after calving, the latter remaining on the inside of the uterus to be thrown off afterwards, in a brownish liquor,

termed the cow's cleansing. When this discharge does not come off in the natural way, it would appear to be absorbed into the circulation. At any rate, its stoppage is the true and immediate cause of the disease. Part of it would appear to be thrown into the intestines, as is indicated by the appearance of the dung; and the remainder separated by the kidneys, passes into the bladder, along with the urine, and causes its discoloration.

The cause of the disease has been attributed to inflammation of the uterus; but the latter affection takes place two or three days after calving, and always produces high symptomatic fever. In inflammation of the uterus, the urine is not more discoloured than it would be in some fevers, and the cow when seized immediately refuses food. In red-water the discoloration of the urine is observed several days before the health is in any degree seemingly impaired. The cow eats, chews the cud, and gives milk regularly. There are no symptoms of fever in the first stages, no laborious breathing, no coldness of the extremities, nor loathing of food until the last stage; but a certain peculiar languor and dulness, which very much characterize this disease.

That the red-water is not local, but constitutional, appears from the circumstance that a cow which has had a severe attack and recovers, almost always loses part of her tail, and sometimes her hoofs also.

Symptoms.—In most cases, the cow, when affected with red-water, is seized with purging. She is drawn together in the belly, especially from the sides between the last rib and the haunch bones. In the parts under the tail, she is not fuller than a spayed heifer. From the shoulders along the spine, and over the kidneys, the skin is very cold, while there is no perceptible difference elsewhere. The heart is felt to beat strongly. The urine, in the first stage, is only slightly discoloured, having the appearance of wort or strong tea. As the disease advances, it becomes darker, until at last it is as

black as tar, on which account the disease is sometimes called Black-Water. At first the cow seems to suffer very little in her general health; but, if proper medicine is not applied, the most obstinate costiveness ensues. In the more advanced stages, she becomes dull, loathes her food, and ceases to chew the cud. The extremities become alternately hot and cold. The palpitation is much increased, there is laborious breathing, great prostration of strength takes place, accompanied with stupor, and death soon ensues.

Morbid appearances.—The third stomach is always found more or less obstructed, its contents sometimes so hard and dry as to crumble into powder. The other viscera appear in their natural state, excepting the kidneys, ureters and bladder, which have the same dark colour as the urine in the last stage of the disease. In the uterus, there is generally a quantity of fetid liquor mixed with some of the secreting glands mentioned above, and which are now partly detached and putrid.

Prevention.—The food should by no means be changed about the time of calving. Giving boiled corn or bear chaff and scalded hay does not seem to occasion the disease, but it certainly makes it more difficult of cure. As a preventive, let the cow have at one dose, on the fourth day after calving, one pound of Epsom salts and six ounces of treacle dissolved in four quarts of water. Let her drink two hours after as much blood-warm water as she pleases. Or, it may be better to administer four ounces of salts, night and morning, from the fourth to the tenth or twelfth days. In either mode, she should get plenty of linseed gruel in her ordinary drink, or administered by means of a bottle.

Cure.—On the first appearance of the discoloration of the urine, let the cow have only succulent vegetables, as the stomach very soon loses the power of returning its contents into the mouth for mastication, and dry food greatly hinders the operation of the medicines. The following purgative should

immediately be administered: Epsom salts $1\frac{1}{2}$ lb, castor oil $\frac{3}{4}$ viii, treacle $\frac{3}{4}$ viii, in two Scotch pints of water. If the cow is not at the time purging, let her also have a glyster, consisting of a Scotch pint of thin water-gruel, in which four ounces of common salt and as much butter have been dissolved. It will be necessary previously to pass the hand up the rectum and remove the dung. The purgative should be repeated at the end of every twelve hours, until the urine becomes clearer. Two hours after each repetition, let her have as much blood-warm water as she will take. At the same time let her also have three bottles of linseed gruel, to be repeated at the end of every four hours. Should she again become bound, it is extremely difficult to open the bowels; but the same practice must be persevered in, with the addition of two drams of calomel, one half at night, the other in the morning, until it takes effect. Let the cow be milked at the end of every two hours. In a very bad case, a seton smeared with blistering ointment has been put with advantage into the dewlap.

It frequently happens that there is difficulty of passing the urine, from spasm in the passage and neck of the bladder, and a want of tone in the organ itself. In this case the parts behind should be fomented with warm water and soap, and then rubbed with the hand for a considerable time. Should the suppression persist, the same treatment should be continued at short intervals. Should this also fail, the hand must be passed up the rectum, and the bladder gently pressed, when the urine will at first flow off mechanically, and afterwards by the exertion of the animal.

When the disease takes a favourable turn, and the urine gradually resumes its natural colour, the purgatives may be diminished, twelve ounces of the salt, and half of the castor oil, being then sufficient. But this quantity must be continued as before, till she is quite recovered. Succulent vegetables alone should be given at first, but after the bowels are pretty well cleaned, and the urine becomes clearer, she may be allowed the moderate use of straw or hay.

In severe cases, after the feces have been brought to a liquid state, it often happens that the cow is so weak as to be unable to put herself in a proper position for discharging them, and they are seen to run off without any exertion on her part. A warm glyster administered at the end of every four hours, will be of great service in relieving her.

During the recovering stage, half an ounce of caraway seeds, and half an ounce of anise seeds, boiled in a quart of ale, and from half an ounce to an ounce of spirit of hartshorn added to it afterwards, when it is cooled to blood-heat, should be given by the mouth. A bottle of this night and morning will much assist in strengthening the stomach.

In some districts of the country black cattle of all sexes and ages are liable to the disease of Red-water. I was called several years ago to attend a considerable number, all males in one of these districts, where the disease is prevalent. The external symptoms were similar to those in the recently calved cow, and the morbid appearances on dissection, namely, the constipation of the manyplies, and the dark colour of the kidneys and bladder, were precisely the same. I there employed the same treatment, which was attended with success.

On inquiry in the district, I learned that the disease attacked all black cattle indiscriminately; that it is known by the names of *Darn* and *Bloody-Darn*; that it occurs during the summer months to cattle out at pasture, extremely rarely at other seasons; that animals reared in this district are scarcely ever affected by it, but those from a district where the darn does not occur, are almost sure to be seized with it; and that the inhabitants when purchasing cattle, are careful to ascertain whether they are *darn-bred*, that is, whether they come from a district where darn prevails.

There is an opinion in the darn district, that the remote cause of the disease is the animal's eating the Wood Anemone (*Anemone nemorosa*), in the pasture lands, and the people give that plant the name of *darn-grass*. On this point, I can only say, that in the district where I reside, and where

the darn does not occur, the Anemone is a very rare plant, whereas in the darn district referred to, it is very common, and we know it to be of a family of plants, many of which are highly acrid and poisonous. Should this plant, or any of the same generally acrid family, be found to be the cause of the disease, it would be a curious subject of inquiry to ascertain how the native animals escape its hurtful effects, whether by learning while young to reject it, or, which is less probable, considering its acrid nature, by their constitution becoming gradually accustomed to it.

VI—ESSAY ON THE RED-WATER IN CATTLE. *By Mr W. ALEXANDER SLAKER, Farmer, Ardifny, Cruden, Aberdeenshire.*

THE cattle most liable to this disease are cows after calving. Calves, after the milk is taken from them, are also liable to it, but in them it is much less dangerous. It very seldom occurs in any other description of cattle. It is most prevalent from the beginning of January to the end of April. Costiveness is the greatest cause of this disorder in cows that have recently calved, as it prevents what is called the second cleansing. Dry, insipid food, such as chaff, is therefore dangerous. Sudden transitions from heat to cold are equally so.

Cows should be bled before calving, and should be kept in tolerably warm houses. Their water should be a little warmed, and should have about a handful of salt dissolved in a pailful. If they refuse their water, in consequence of the salt being in it, dissolve a large handful of salt in a pint of water, and administer with a bottle each morning. Care must be taken that they do not get frosty turnips; their food should be turnips and hay or straw alternately. If costiveness appears, give two pints of strong wort, with half an ounce of flower of sulphur mixed. If this does not operate, repeat the dose for two or three mornings.

When Red-water appears, the best cure is a pound of common salt and four ounces of Epsom salts, dissolved in two pints of warm water. About half an hour after, give four pints of water-gruel, with half a pound of butter dissolved in it. The gruel must be continued every two hours, in the quantity of two pints. If the cow has not begun to mend at the end of twenty-four hours, the dose must be repeated as before. If this fail in opening the bowels, it may be aided by a glyster prepared in the following manner: Boil an ounce of aniseseed in a pint of water, dissolve four ounces of butter, and a table-spoonful of salt in it, after the seeds are drained out. The above simple treatment has proved more efficacious than any of the complicated ones in common use; and, indeed, the varieties of medicine employed in this disease are very numerous.

For calves attacked by the Red-water, the following purge seldom fails in producing a cure. Give a strong calf four ounces of Epsom salts, with half an ounce of saltpetre, dissolved in about half a Scotch pint of water, followed by a pint of gruel prepared as above.

The site of the disease appears to be more particularly about the kidneys; but more animals die of the fever which it produces, than from the direct effects of the malady itself. The fever which attends the disease has an extraordinary effect in drying up the intestines, the mannyplies being often so dry that it might almost serve as fuel, so that no medicine whatever could have passed through it. It is therefore of the utmost consequence to keep the bowels open, during the whole of the period at which the Red-water is most likely to make its attacks

VII.—ESSAY ON RED-WATER OR MOOR-ILL. *By Mr A. WATT, Druggist, Kintore.*

THE cattle most liable to this disorder are cows after calving. It prevails most in the spring months, but also appears in autumn and winter. It is produced by dry food, difficult of digestion; and is always found among cattle that are fed off newly improved lands, and on turnips and straw that have grown on poor ground. Neglect of proper watering, and feeding on turnips after they have begun to grow in spring, are also causes.

To prevent the disease, cows after calving should be sparingly fed for some days; their turnips should be fresh and free of growth. No corn or barley should be given, as is the practice, immediately after calving. Boiled chaff, mixed with some oats, and a sufficient quantity of turnips, is considered the best kind of food. Common salt or nitre, pounded and mixed with the food, are also considered good preventives.

The disease proceeds from indigestion and obstruction of the biliary ducts. A yellow tinge pervades all parts of the body; the gall-bladder, liver, and pancreas are diseased. The stomach and intestines lose their power in some degree; the animal ceases to chew the cud, sometimes from the very commencement of the disease. Sometimes the bladder loses its power; there is contraction of the urinary passage, and the urine is red or black, according to the urgency of the disease.

The indications in this disease are, 1. to palliate urgent symptoms; 2. to remove the cause of obstruction of the bile. A liberal use of opium, with mercurials, alkalies, sulphuric acid, turpentine, ether, and nitre, is the best practice. I have found the annexed recipe to answer better than any yet tried, as, out of upwards of two hundred trials, it only failed in four. Take of tincture of opium, half an ounce; sulphate of potass, half an ounce; sulphuric acid, 60 drops; spirit of

hartshorn, one ounce: mix, and give in a bottle of new milk. Repeat every eight hours. This is a dose for a cow in good condition, about from four to five hundred weight. The medicine should be applied immediately on the appearance of the characteristic symptoms, and should be repeated at the end of every eight or ten hours, until a change takes place, which commonly happens on the application of the second or third dose. If there should be costiveness, injections of butter, green oil, and warm water, should be employed. Loss of the hoofs and part of the tail, sometimes follows this disease, and may be prevented by rubbing the back and legs with salt-brine, twice a-day for a week after the disorder has been subdued. While under the above medicines, the animals should be fed with linseed, meal-seeds mixed with water, or some boiled chaff mixed with turnips.

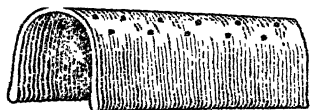
ESSAY ON DRAINING AND LEVELLING CLAY-LANDS. *By*
Mr J. CARMICHAEL, Raploch Farm, near Stirling.

NOTHING has tended more to improve and increase the value of clay-lands than the modern method of levelling and draining, the advantages of which are nowhere more apparent than along the banks of the Forth. Five-and-twenty years ago, wedge-draining was almost unknown, or, at least, very partially practised, in this district; but within the last seven years, probably one-half of all the carse-lands in Scotland has been wedge-drained, and the remaining portion is undergoing the process.

But the method first employed of forming the drains of turf or wedge-shaped pieces of the toughest clay, dug out of the drain itself, has generally been found not to answer the purpose so well as those in which the drains are constructed of tiles, or even wood, thorns, or peat. In the former case, the turfs give way, and are easily broken down; and even in the latter, the sides of the drain often burst in below the

wood or thorns, in rich clay soils, and the water-course is thus obstructed. It is therefore surprising that landlords do not more generally encourage the most effectual method of performing this important improvement. Where assistance is withheld, and part of the lease has already expired, the tenant naturally adopts the cheapest method, and, regardless of any extended or permanent improvement, cuts a drain, which he supposes will last until the end of his lease. When the lease comes to be renewed, the tenant has to drain the same fields over again, and that with more than a repetition of the original trouble and expense; for it is scarcely possible to recast and refill wedge-drains with the same ease and advantage as at first,—and a new level, or different direction of the drain, is not always practicable in such flat grounds.

It is difficult at present to determine how long tile-drains, when properly executed, may last. It cannot be doubted that their durability depends in a great degree upon the preparation and due management of the tiles. As it is well known, that, of roofing tiles, such as are coarse, porous, or ill-burnt, do not last so long as the best kinds, it may reasonably be inferred, that tiles of the former description will be the first to decay or give way, when subjected to the pressure and perpetual moisture of a drain. It would, therefore, be of importance to pay more attention to these circumstances. It would also be an improvement were a few small holes, about two or three eighths of an inch in diameter, made in the curve of each tile. This could very easily be done by fixing a few pins or pegs in the block of wood, or mould, on



which the tiles are formed. The holes would thus be bored from the concave to the convex surface of the tile; and as the external aperture of each hole would be narrower and more ragged than the internal, this circumstance would prevent the incumbent clay or soil from penetrating so readily

through the holes, after the drain is filled up. The object of these holes is to afford ingress for the water to the drain when the replaced clay becomes a solid mass again, and adheres too closely to the tiles, which must ultimately be the case, particularly in arable lands, where the drains are placed in the furrows between the ridges, and are constantly subjected to the pressure of the horses' feet during seed-time and harvest. This also shows the propriety of always covering drain-tiles with a thick layer of small thorns, fir-tops, furze, heath, or other brushwood, before any clay is thrown over them, which will partly answer the same purpose, and also prevent the loose clay from passing between the joints of the tiles and obstructing the drain. Where such drains run parallel to the ridges, it would be better to place them a little to one side of the water-furrow.

But, whatever the errors in wedge-draining may be, they are likely to be much sooner remedied than those of ridge-levelling. In the former, observation and experience will necessarily lead to perfection; but in the other, there still prevails in many quarters a most absurd prejudice against the very idea of levelling corn-lands, and this for no other alleged reason, than that some indolent farmer in the neighbourhood may have injured a good field by his injudicious manner of levelling it; that is, by ploughing or paring the heights into the hollows, and thus bringing a large quantity of the best surface soil beyond the reach of the roots of any ordinary plant, while a much larger space is rendered bare and perfectly sterile by the operation.

That this is the fact cannot be denied. Yet it only proves the ignorance of the operator, not the imperfection of the system. Were the farmers in the Carse of Gowrie to reduce their huge high-crowned crooked ridges to straighter lines, giving them a breadth of from fifteen to eighteen feet, they would find that they might, with more propriety, term their district "the garden of Scotland." They would not have so

often to complain of *rusts* and *mildews*, and crops inferior to those of other places. It is quite impossible for any one, in the least acquainted with the management of clay soils, to pass from Perth to Dundee, without being struck by the shape and size of the ridges, compared with the improvements that have been effected in that rich district. A proper levelling of such soil would be almost equivalent to regular trenching, with less than half the cost; and by combining this operation with till-draining, the annual labour, and consumption of manure, would be greatly lessened, while the annual returns would be greatly increased.

The awkward and unequal breadth of these ridges, the waste of time, and the poaching of the furrows, occasioned by continual turnings in ploughing and harrowing, the obstruction to the air and sun, the exposure to the storm on the ridges, and the defective crops frequently resulting from these circumstances, clearly shew the advantage of having ridges formed of moderate height and breadth, and of uniform shape, in preserving clay lands dry and fertile.

As example in illustration is always preferable to mere precept, the following is given as the mode adopted for seven successive seasons, in levelling the different fields of a farm of one hundred acres in the Carse of Stirling. In winter ploughing the land intended to be levelled and straightened the succeeding summer, the plough was entered on the side of the ridge, exactly in the middle between the crown and the furrow. One fourth of the ridge was thus *gathered* or thrown back from the furrow on each side, while the furrow was left as open and deep as possible. The remaining part of the ridge was then *cleaved* or spread, and the crown laid completely bare, every ridge being as it were divided into two. The whole remained thus high and dry during the winter. In May or June following, the plough was again introduced on the side, about two yards from the centre of the old ridge, and the surface soil still farther removed from the crown, so

as to lay about five feet of the subsoil quite bare. This space was then ploughed up, and formed into a parallel heap or drill, and removed into the old furrow, either by a two-horse scoop, or with shovels. The plough again entered the crown, and formed another drill of the still deeper subsoil, which was also thrown into the furrow. The same operation was repeated as often as was necessary to raise the furrow apparently above the level of the centre. This being done, a part of the accumulated surface soil on the sides of the ridges was thrown back by the plough, as a partial covering to the subsoil in the furrows, and the remainder returned to fill up the vacuity in the crown. The land was then cross-harrowed, and twice cross-ploughed and harrowed alternately, as deeply as possible. Any remaining inequalities were removed before new-forming the ridges.

The whole process is exceedingly simple, and its advantages are perfectly obvious; for, while every particle of the original surface soil is thus carefully preserved, the subsoil is so sparingly and equally incorporated with it, that not a doubt can remain of the beneficial result of the operation. Where the former ridges have been very broad and high, it will sometimes be found necessary to remove part of the subsoil from the sides, after the centre has been re-filled, particularly when the land is tilly below; but this can easily be performed by two or three women or boys going after the plough, and throwing the masses of till that are turned up into the old furrows; or, if the ridges are too broad for this mode, the scoop may be applied as before.

If the land has not been previously drained, it will naturally occur to the operator, that he ought to make the drains before proceeding to level the field, as they can be formed at much less expense, and far more efficiently, while the old furrows are open, provided a proper level or outlet can be obtained to suit these furrows. For it is plain, that any spring, or even the surface water, in a field so levelled, will

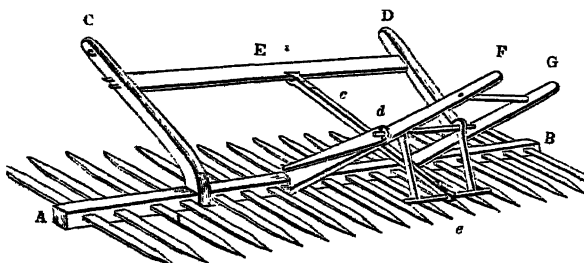
still continue to flow towards the old furrows, where so much loose earth has now been placed. A drain in each of these curvilinear furrows, will either directly intersect, or obliquely cross, rectilinear ridges; and, consequently, must, in point of position or duration, prove infinitely preferable to drains placed in the new furrows. Perhaps it will be objected, that the labour of levelling a large field or farm, in this manner, must be immense, and that an estimate of the probable expense ought to be given. But this is impossible, as much depends upon adventitious circumstances. A field of twelve acres, for example, may require as much time and trouble to level it, as one of eighteen acres. It may, however, be safely averred, that, with a little extra attention on the part of the master, and activity on the part of his men, every difficulty may be surmounted, and the task accomplished more easily than may at first sight be imagined. Nor will the horses, if cautiously managed at first, sustain any injury from the draught of the scoop, provided care be taken not to overload them, and also to leave the whole of the subsoil completely loosened by the plough, before the scoop is used. In changeable weather, no more subsoil should be ploughed up than can be removed in one day; but if the weather be dry, the subsoil will be rendered much lighter, by being turned up to the sun the day previous to its removal. The swing or revolving scoop, which is emptied without the man who guides it being obliged to loose his hold of the handles, will be found the safest and most convenient. In order to get it easily in and out of the trench on the crown of the ridges, it ought to be made of nearly the following dimensions:—Bottom or sole 44 inches, from right to left in front, tapering to 38 inches at the back, by 33 inches, including shoeing, from centre of front to back, back and sides 15 inches deep. The shoeing should be a little rounded at the extremities in front. Such a scoop is best adapted for two horses, more being a hinderance. If these are steady, an expert hand may occasionally manage the whole without any driver.

November 1. 1830.

DESCRIPTION OF AN AMERICAN HAY-RAKE.

MR ARCHIBALD RONALDSON of Saughland, near Edinburgh, about four years ago got an American Hay-Rake, which he used upon his farm, and a model of which he afterwards presented to the Highland Society. This rake is drawn by one horse; and it can be made to go either along or across the ridges, as may be required. It can carry between 10 and 12 stones of hay; and when that quantity is upon it, the hay can be deposited, by a simple revolution of the instrument, afterwards to be described, in rows, or at any particular place required, without stopping the horse.

The same instrument was employed by Mr Ronaldson for going over his corn-stubbles, and has since been used by other farmers for the same purpose. Where grain is lodged or much broken down by high winds before it is cut, there are generally a great number of straggling stalks allowed to remain upon the stubble; and in any case, but much more so one like this, the rake will be useful. Mr Ronaldson states, that he conceives this instrument, with a man and horse, equal to the work of 20 men with common rakes. But perhaps, on stating this power of the instrument, Mr Ronaldson has presented the most favourable side of the case.



The head *A B* is 9 feet 8 inches in length, and 4 inches square, into which are inserted 18 teeth, *a*, *b*. Each tooth

is 3 feet 11 inches in length from *a* to *b*, that is, 1 foot $9\frac{1}{2}$ inches on each side, and 4 inches for the breadth of the head A B, through which they pass; these teeth are $1\frac{5}{8}$ inch broad by $1\frac{5}{8}$ inch thick or deep. About 5 inches next the point *a* they are tapered on the under side, and the same length at the point *b* on the upper side, to prevent in some measure the teeth from having too great a tendency to go into the ground.

The frame to which the draught is attached, consists of the circular beams C and D, with the connecting stretcher E. The beams C and D at the end next the head A B, are each cut into a semicircle and made to run round the journal of the head, which is wrought to 3 inches in diameter, by 2 inches in length, and bound by an iron-strap upon these beams forming the outside. At C and D are straps to which the horse is attached by traces or ropes, in a similar way to that in which it is attached to the plough, but without swingletrees. The stretcher E, which attaches the beams C and D, is 5 feet $4\frac{1}{2}$ inches in length, measured over the beams.

The part by which the instrument is guided, consists of the handles F and G, forming a frame 4 feet 7 inches long, by 2 feet 2 inches broad. These handles are circled and strapped for the journal of the head, in the same manner as the beams C and D. A little from the end of the handles at F and G, is a round connecting stretcher; and at *d*, 2 feet from the centre of the head, is another round stretcher. From this latter stretcher is appended the frame *e*, forming a parallel motion. The two standards of this frame are each $12\frac{1}{2}$ inches long, or, from the outside of its head at *e* to the centre of the stretcher, 10 inches. There is a connecting rod *c*, 3 feet 8 inches long from centre to centre, which is circled and strapped round journals at E and *e*. The round stretcher at *d* is continued on the outside of F and G, so as to accept of a rod or catch on the outside of these handles, as seen at *d*, 2 feet 10 inches long, or 2 feet $2\frac{1}{2}$ inches to the centre of the con-

necting stretcher at *d*; and upon the head A B the other end of each of these two rods or catches rests upon a kneed strap, a similar strap being also on the reverse side of the head.

Now, when the frame C D E, to which the draught is attached, is in its proper position, by depressing the handles F G, the parallel motion at *e* will be pressed against the hind teeth, and thus the fore ones can be raised up, in order to surmount any inequality of ground. And when it is wanted to depress the fore teeth, the handles F G are to be raised, by which the rod or catch at *d* and its opposite side act upon the kneed straps on the head. When the rake has collected as much hay or corn as it can conveniently carry, it is emptied in the following manner. By raising the handles F G to a certain extent, the fore teeth are depressed in the manner above described, and (the point E remaining the same) the rod *c* pushes the under side of the parallel motion without the hind teeth. In this manner, as the beams and handles are all placed between the teeth, so as not to come in any way in contact with them, the fore teeth take the ground, and cause the whole teeth with the head to revolve, and deposite the hay or corn which the instrument was carrying at the time. By this revolution of the teeth and head, the instrument will again be in its proper position for working, all the difference being merely that the under side of the head will now have exchanged places with the upper side, and the fore teeth will now have exchanged places with the hind teeth.

REMARKS ON BREEDS OF SWINE.

I. REMARKS ON THE CLASSIFICATION OF SWINE. *By* ROBERT WALLACE, Esq. of Kelly, in a Letter addressed to the Directors.

As this is the period, I believe, for deciding on the premiums to be offered for the following year, I beg leave most respect-

fully to suggest, that, in awarding prizes for swine, it always seemed to me impossible to comprehend the distinctions made by the practical judges, in deciding at one and the same time on the merits of all the varieties of these animals. It has seemed to me no less requisite to class swine than to class horses, horned stock, and sheep, and that until this shall be done and acted on, it will remain a mere matter of accidental, local opinion, whether the large-sized bacon, or the middle-sized, or the smaller kinds bred from the crosses of the Chinese and any other known variety, are really the most profitable. I beg leave most respectfully to state it as my own opinion, that each of the best sorts of each of the above kinds, will be found most profitable to different feeders, and best adapted for different districts, and, therefore, that advantage might result from having them classed,—certainly satisfaction would; for, in such mixtures as are invariably produced, no two judges are found to agree on the prominent points of excellence; whereas in the case of horses, horned cattle, and sheep, judges can in general easily agree as to the leading points. Again, one set of men judge all kinds of swine; but in the other cases alluded to, men are supposed capable of judging only the particular kind they have been chiefly accustomed to manage.

KELLY, *December* 18. 1830.

II. REMARKS ON THE PRECEDING LETTER, AND ON THE DIFFERENT BREEDS OF SWINE. *By JAMES BELL, Esq. of Woodhouselee.*

HAVING perused Mr Wallace of Kelly's letter regarding the varieties of swine, and the manner of awarding the premiums offered by the Highland Society, as he supposes, by the judges at their shows, I beg leave to offer the following remarks.

No person at all acquainted with the subject, can doubt that Mr Wallace is right as to different varieties being suitable for different districts, and the purposes for which they are intended. The varieties of this useful animal are numberless in almost every district of this empire, arising from the crosses which have taken place; so that few of any pure or original breed are to be found, excepting in some particular districts, such as Berkshire, Suffolk, Oxford, and, for the larger breeds, Hampshire, Northamptonshire, York, and Cumberland.

It cannot be denied that one kind is more suitable for bacon, another for curing as mess or table pork, and others, in which gentlemen are extremely fanciful, and commonly think their own best, for family use, either roasted or boiled. I must, however, beg leave to differ entirely from Mr Wallace, when he supposes, that the awarding of premiums by judges, has been done in any degree by accident, or without their having duly considered the merits or points of the different animals exhibited, and the purposes for which, they have reason to believe, they are principally intended; keeping always in view the kind from which the farmer who rears and fattens them may be expected to derive most profit.

It is taking too limited a view of the matter to suppose, that judges would be selected who would decide from local prejudice, preferring the kind they have been accustomed to manage. Judges would require to be possessed of correct general knowledge of the kind of animal best adapted for the purposes for which they are used in different districts; and I have never been at any of the shows at which I have seen difficulty, or almost any difference of opinion among the judges, as to the animals to which they would award the premium.

I may take the liberty here of noticing the different descriptions of Hogs, which I conceive to be best suited to the different objects in view.

For bacon, when curing of it is considered a staple article, the larger breeds are always preferred, being found most profit-

able for the farmer, and readily taking the market: such as may weigh, when killed, the four quarters, from 18 to 22 imperial stones. It is true they have not such a propensity to fatten when young, as most of the smaller varieties; but this is not necessary, as they cannot make good bacon or hams, till they are from fifteen to eighteen months old, at least; and they are usually kept till that age, and are then very easily fattened sufficiently for the purpose.

For the purpose of curing for pork, as an article of trade, the middle sized, such as the Northumberland, Berkshire, Suffolk, and Oxford breeds, are to be preferred. They have sufficient tendency to fatten, particularly the Berkshire and Oxford breeds, and their flesh is more delicate, partly, perhaps, from being killed at an earlier age. The ordinary weight is from 8 to 10 or 12 stones.

The varieties, as has been noticed, are endless, mostly from having been crossed with the Chinese breed, which have more tendency to fatten than any other; but, from long experience, I am inclined to think their flesh is by no means delicate; and they have the disadvantage of going almost entirely to fat, with scarcely any lean, while their meat is very greasy.

For family use, I would prefer the Berkshire or Suffolk, killed early. The Chinese, at six or eight months old, when killed, may weigh in ordinary from 4 to 8 stones, and by high feeding may, when a little older, be brought to nearly double these weights. They are then, however, very coarse meat.

The curing of bacon prevails most as an article of commerce in the counties of York, Cumberland, Hampshire, Northampton, Dumfries, Galloway, and in the northern and other parts of Ireland.

Pork is more generally cured for what is called Mess, or Table Pork, or for the London market, near the principal sea-ports, and along the east coast, where they have facility in shipping for the London market. In Ross-shire and Cromarty, they have cured largely for the London market since

about 1792 or 1793, when, I remember, the trade was set a-going by a Mr Middleton, from Northumberland, who settled in that country. He introduced the Berkshire breed of swine, which is excellently suited for the purpose, and of which, at least, the crosses are still common there.

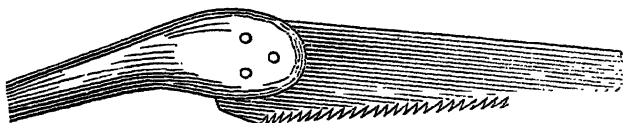
In Northumberland, and within reach of the Newcastle and Shields Markets, those animals, whether cattle, sheep, or swine, that come early to fat, *however coarse, if large*, are preferred for the coal-heavers, and others employed in that trade.

COMMUNICATION RESPECTING THE INDIAN SAW AS ADAPTED TO PRUNING. *By JOHN ROBISON, Esq. Sec. R.S.E.*

I BEG leave to submit to the notice of the Highland Society an implement of general use in India, and which I apprehend may be found useful in the rural economy of this country, as it will enable the forester to remove irregular branches from all sorts of trees, in many cases without the aid of a ladder, and therefore, in a much more expeditious way than usual.

The instrument I allude to is a saw, which differs from the saw as commonly used in this country, principally in having its teeth formed so as to cut by a pulling stroke, instead of a pushing one. A little consideration, and the slightest inspection of the instrument, will serve to shew that this small difference in arrangement will produce an important one in result. If a saw with teeth set in the usual way were to be fixed on the end of a long pole, and an attempt were made to cut a branch of a tree overhead with it, it would be found, even in the hands of an expert workman, altogether inefficient, and liable to be broken by the smallest exertion of strength. If the teeth be reversed, the circumstances alter entirely, and the most unpractised person will find that he can saw through any accessible branch with ease, and without danger of break-

ing the saw-blade or the pole, as the utmost exertion of his strength will not bend them by pulling.



In attaching a saw of this kind to the end of a pole, the line of the teeth should be directed a little inwards, to cause them to act on the wood, without pressure being necessary on the handle of the pole. For soft woods, a very slight inclination (about two degrees) will be enough; but in hard woods the implement will be found to work well with a little more inclination.

The same sort of saw may be usefully employed (with a short handle, and of smaller dimensions, according to circumstances) in pruning orchards. If the blade be made small and flexible, like what joiners call a key-hole saw, it will be found very manageable in cutting out such stumps and crooked branches in wall-trees, as are not easily got at with the common saw.

NOTE ON THE HOPETOUN OAT.

COMPLAINTS have been received regarding the variety of oat introduced and recommended by Mr Patrick Shirreff, and described in the last number of the Transactions of the Highland Society. It has been stated that the oat does not entirely answer the description given of it.

The Highland Society offers an annual honorary premium, "To any person who shall, on or before the 20th October in any year, report to the Society any new species or variety of useful plant, adapted to the ordinary field culture of Scotland, the silver medal, or a piece of plate, as the Directors

may see fit, in the circumstances of the case. Satisfactory evidence is required, that the plant produced is new in the cultivation of the country, either as regards the species or variety,—valuable as regards the uses to which it may be applied, and congenial to the soil and climate of Scotland. A particular detail of the discovery or circumstances which led to the experiment, must be furnished,—the mode of culture described, and a specimen of the plant transmitted.” Mr Shirreff, an intelligent practical farmer in East Lothian, claimed the premium for the variety of oat which he had cultivated, and to which he had given the name of the Hopetoun Oat. Ample certificates having been produced, an honorary silver medal was awarded to Mr Shirreff, and the description and certificates were published in the Transactions of the Society. The opinions, it will be seen, of gentlemen whose judgment is entitled to great weight, was decidedly expressed in favour of this new kind of oat.

That all may not have been equally successful in their experiments, or may not have formed the same favourable opinion on the subject, is what is constantly seen in practical questions of this kind. One gentleman in particular, a member of the Highland Society, who is also a distinguished agriculturist, states that he entertains an unfavourable opinion of this oat. He mentions, that last season he tried it in comparison with the potato oat; that he sowed the same quantity of each in the same field and kind of soil, and at the same time; that the ground was in good condition, and both oats were similarly circumstanced in every respect; and that the Hopetoun oat was later in ripening, and decidedly inferior both in quality and produce.

A sample of this oat has been recently examined. It is of fair quality, though not so large and plump as the potato oat. A quantity of both oats has also been weighed, in a similar state of dryness. The Hopetoun oat weighs $45\frac{1}{2}$ lb., and the potato oat 48 lb., per imperial bushel.

ACCOUNT OF THE DISTRICT OF BUCHAN. *By RODERICK GRAY, Esq. Peterhead.*

THE district of Buchan is situated on the north-east coast of Scotland, between $55^{\circ} 16'$ and $55^{\circ} 38'$ north latitude. It extends along the coast from the Ythan almost to the Doveran, a distance of above 40 miles. Its length from north to south is about 27 miles, and from west to east about 28. The superficial content is computed to be about 450 square miles. By the census of 1821 the population was about 47,000, and cannot now be rated under 55,000; making about 122 inhabitants to the square mile.

The district is divided into twenty-one parishes, viz. Ellon, Slains, Cruden, Peterhead, St Fergus, Crimond, Lonmay, Rathen, Fraserburgh, Pitsligo, Tyrie, Aberdour, King Edward, Monquitter, Turriff, Fyvie, Methlic, New Deer, Deer, Strichen, and Longside. The parishes of Fyvie, Methlic, and Turriff, are partly in this district, and partly in the other part of Aberdeenshire.

Buchan, along the coast, and to a considerable distance landward, is low and level. In the interior and western divisions, there are considerable eminences and variety of surface. Mormond, its only hill of note, rises to an elevation of 810 feet above the level of the sea.

Towns and Villages.—Proceeding from the Ythan northward, the towns and villages on the coast are Collieston, Whinnyfauld, Ward, Bullers of Buchan, Longhaven, Boddam, Peterhead, Buchanhaven, Rattray, St Combs, Cairnbulg, Inveralochy, Fraserburgh, Broadsea, Pittullie, Rosehearty and Pennan. The towns and villages in the interior are Ellon, New Deer, Old Deer, Turriff, New Pitsligo,

Strichen, Fetterangus, Stewartfield, New Leeds, Cummineston, Byth, Longside, Mintlaw, St Fergus, and others of less importance. Peterhead and Fraserburgh are places of considerable trade, and have excellent harbours. Of the villages, many are of considerable size : those on the sea-coast are inhabited chiefly by fishermen.

Former State of the District.—From a charter of King Robert Bruce, it appears that Buchan once formed a county of itself. It was afterwards an earldom, and gave the title of Earl to the Chief of the Cumines. These Earls were very powerful, and possessed a great part of the lands of Buchan, and some lands in Formartin. In 1309 their estates were forfeited, and divided among the adherents of King Robert Bruce.

Tradition says, and the large tracts of moss with the remains of wood in them at the present day evince, that Buchan was in former times a well wooded district, and that the forests extended down to the German Ocean. Being flat and little elevated above the level of the sea, this district has always afforded a considerable extent of pasturage and arable land.

General Appearance of the District, and Nature of the Soil.—The district is opened up by excellent turnpike roads, made within the last thirty years. There are three turnpike roads from Peterhead, one to Aberdeen by Ellon, one to Banff by Old Deer, and another to Fraserburgh by St Fergus and Crimond, joining the one from Peterhead to Banff at New Pitsligo. The road from Aberdeen to Banff by Old Meldrum, Fyvie and Turriff, touches upon this district, and in one part passes through it. A turnpike road has lately been opened between Aberdeen and New Deer. From the formation of so many lines of road, and the commutation of the statute labour, the old cross roads have been kept in better

repair, and many new lines and junctions with the main roads opened ; so that, in regard to roads, this district is as well accommodated as any other in the county, or perhaps in Scotland.

At the Ythan the coast is low, and covered with drifted sand to a considerable distance landward. It is said that a considerable part of a parish (Forvie) was destroyed by this drifting of the sand. The coast of Slains and Cruden is high, terminating towards the sea in cliffs and precipices, and indented with caverns and straths. The dropping Cove of Slains, and the Bullers of Buchan, so much visited, and so often described, are upon this part of the coast. From the Water of Cruden to the mouth of the Ugie (a mile northward of Peterhead) the soil is upon granite, which is generally at no great depth from the surface. Part of Cruden, and along the coast to Boddam, including the Stirlinghill, the soil is for about half a mile inland scanty, and scarcely admits of cultivation to any extent. From the mouth of the Ugie to Fraserburgh, there is a sandy beach, with extensive downs or links between it and the arable land. This beach extends for a few miles beyond Fraserburgh, when the coast becomes precipitous, and continues so until it reach nearly to the mouth of the Doveran.

The soils in the district are various, but chiefly composed of clay, of a red, brown, white, or greyish colour. In some places the clay is mellow and friable ; in others stiff, and with difficulty reduced to a mould.

In those places that have not been cultivated, there is for the most part upon the surface a stratum of moory soil, of rather sterile quality, which is separated from the subsoil by what is provincially called a Pan. This pan is of a metallic nature, very hard, from an eighth of an inch to two or three inches, and in some places of greater thickness. It is impervious to water, and the plough runs upon the surface of it

as upon a sheet of iron. It is at various depths from the surface, in some places within a few inches, in others more than a foot from it. In some situations there are many of these pans, one below another alternating with strata of sand, gravel and clay.

In the parishes of Ellon and Methlic, the soil is various. A sharp clay-loam, with a considerable portion of sand and gravel upon a dry rocky or gravelly bottom, extends along the north side of the Ythan; but the greater part of the northern division of these parishes is a thin clay, mixed with moorish soil, on a subsoil of clay and stone.

In the parishes of Slains and Cruden, the soil consists more of clay and decomposed granite, and, in most places, the second stratum is better than the first. The subsoil is retentive of water in some places, from being a mass of clay, and, in others, from the pan under it. The south and south-west parts of the parish of Slains, and the south part of Cruden, consist of deep mellow-loam.

The parish of Peterhead is pretty similar to Cruden in regard to soil. Along the coast, generally a strong clay, in some places mixed with sand and black earth to a considerable depth, and resting on granite. On the north-west parts, the soil is loamy, and on the west, moorish, principally composed of friable clay, mixed with peat-moss, gravel, sand, and flint. Experience has shewn that this soil is capable of being cultivated.

In the parish of St Fergus the soil consists of three distinct divisions. Along the coast it is sandy loam, easily cultivated, and produces bulky crops, although the grain is of a rather inferior quality. The middle division is a strong adhesive clay, capable of producing weighty crops of grain, but stiff, and not easily reduced to a mould, and therefore not well calculated for turnips. The west division is inferior and rather moorish, having a cold subsoil, and interspersed with moss. The north and east parts of the parish of Crimond consist, with

few exceptions, of rich sandy loam; the south and west of thin clay, and moorish land and peat-moss.

In the parishes of Lonmay, Rathen, Fraserburgh, Tyrie, Pitsligo and Aberdour, the soil is generally a clayey, sandy, or gravelly loam, upon an open subsoil, and excellently calculated for producing weighty crops of barley and turnips.

In Strichen, New Deer, and Monquitter, the soil consists generally of clay, in most places mixed with reddish sand and gravel, and in some places with moss. In these parishes there is a considerable extent of ground hitherto uncultivated, but which might be brought into cultivation at a moderate expense.

King Edward, and those parts of Turriff and Fyvie which are situated in this district, are for the most part strong loamy soils, of good quality, and capable of producing excellent crops.

The parishes of Old Deer and Longside are situated in the centre of the district. The soil varies from a clay to a clay and gravelly mould of good quality. These parishes are much beautified by the thriving woods of Pitfour, Aden, and Crichtie, which render their appearance very different indeed from the lower parts of the district, where (though undoubtedly once well wooded) there is now scarcely a tree to be seen.

The lands along the coast, in this district, are very closely cultivated. That part between Peterhead and Fraserburgh, and extending from the coast to New Deer, a surface of about 160 square miles, is (if we except the hill of Mormond, some pretty extensive tracts of moss, and a few small patches) wholly cultivated.

Climate.—The sea-coasts of Buchan are much exposed to storms from the north and east, which often do considerable injury, especially if, as is sometimes the case, they happen in the summer months when the crops are in bloom. Owing

to the level surface of the district, and its little elevation above the level of the sea, the effect of such storms is experienced to a considerable distance from the coast. From its local situation, the nature of the soil, and the want of shelter, the climate of Buchan is rather cold and moist; and in the neighbourhood of mosses and swamps, the crops are late in coming to maturity, and sometimes injured by mildews. Of late, however, the climate has been considerably improved by extensive drainage and a better system of agriculture, and it might be still farther improved by more drainage, and by planting clumps and belts of wood, which would at once beautify and shelter the surrounding country.

Minerals.—The prevailing rock in this district is granite. Near the east coast it is of the red kind, very perfect, and resembling the Egyptian. The component parts are quartz, mica, and felspar. It can be raised in very large blocks, and admits of being finely polished. The docks and other works at Sheerness were built from the granite of Stirlinghill, in the parish of Peterhead, and Blackhill of Cruden; and the pillars in the British Museum were taken from the same neighbourhood. A ridge of granite, at a little depth below the surface, runs across the district from the Bullers of Buchan, until it reach the sea, within a few miles of Banff. Although granite in this district is in general red, yet various shades are to be found. In some situations, white predominates, and in others blue. Sometimes it is large grained, and the component parts well marked; while, in other situations, the granulation is smaller, and the component parts run more into each other, rendering it not so perfect.

In many places the soil consists of granite and flint in a state of decomposition. Along the coast there is shell sand in abundance. Limestone is found at Hythie, Strichen, Anochy, and some other places. It has been tried as a manure and for cement, but it is not generally very pure; and from the expense

of burning and other circumstances, the farmers can supply themselves at as cheap a rate with lime brought from Sunderland. The crystallization formed by the dropping cove at Slains, consists of carbonate of lime. Flint abounds in the elevated grounds and moors, especially near the east coast. These flints are formed upon or contain the remains of shells of various kinds, but are not connected with chalk, and the substance of the shell is converted into flint. At Gamrie and Trouphead, there is a conglomerated stone, in parts of which there are impressions of fossil fishes. It is said that blocks of quartz of a pure white colour have been sent from New Deer (where they abound) to Newcastle, to be used in making glass and stone-ware. In many places the springs and drainage water are impregnated with iron, and the subsoil contains a good deal of that metal, where it consists of the crust before referred to; but no ironstone or ore has been found worth working.

Mosses and Wastes.—It has been estimated that not much above the one-half of this district has been cultivated; but, upon referring to the map prefixed to Dr Skene Keith's report, and taking into consideration the large extent along the coast closely cultivated, it may be assumed as near the truth, that two-thirds are under cultivation. In the neighbourhood of New Deer, a large extent of land had at a former period been under the plough, but has been allowed to get again into its natural state of heath. With liberal encouragement, however, and under long leases, there can be little doubt that not only these might be again reclaimed, but the whole waste lands in the district (with the exception of the hill of Mormond and some others of no great extent) might be rendered arable.

The most effectual method of treating such lands appears to be, 1st, to make good roads through them, communicating with the lines of turnpike; 2dly, to drain them effectually of under and surface water; 3dly, to remove all heath and dead moss by burning; 4thly, to remove the stones upon the sur-

face; and, lastly, to plough or trench to such a depth as to penetrate below the ferruginous crust or pan. The first and second steps should in general be performed by the proprietor, and the others by the tenants.

The first crop may be obtained from the ashes of the moss and heath, and the fodder of this crop will be the means of making an additional quantity of manure. It is impossible, however, to cultivate such a quantity of waste land to advantage, without more manure than can be produced upon itself; but with a command of manure, the improvements (slow and unsatisfactory without it) may go on very rapidly. It is to be regretted that so many proprietors, either from want of power in consequence of entails, or from a desire to have an immediate return from such lands, do not grant sufficient encouragement to tenants to induce them to undertake the improvement of them. By granting such encouragement, proprietors, although they should not benefit themselves in the first instance, would undoubtedly not only improve the value of their estates, and beautify their appearance and that of the surrounding country, but also afford employment and support to a numerous and industrious tenantry, while they would benefit at the same time the country at large, and leave to their families an estate beautified and increased in value.

Large tracts of moss in this district might be converted into pasture by surface drains communicating with main ones, so as to render the surface moderately dry, by ploughing, or delving, and burning part of the dead moss upon the surface, mixing the ashes with the moss, and sowing common meadow grass. Crops of grain might also be obtained from these mosses by various modes of cultivating the surface, without injuring the under moss. The peat might be dug from under the surface soil, and when removed, the subsoil might also be brought into cultivation; and thus no more of the moss would be left unproductive than what is required annually for digging and drying peat.

Water-Meadows and Grass-Lands.—The late Mr Ferguson of Pitfour, M. P., set the example in this district of making water-meadows, and laying out lands with grass-parks. He got an experienced flooder from England, and converted $81\frac{1}{2}$ acres into meadow, from which he drew from 15 to 20 per cent. upon the sum expended. These meadows are upon the banks of the Ugie. There are not many situations here where flooding could be introduced upon a large scale; but it is to be regretted that this means of improvement is not more attended to. The grass lands are generally laid out with clover and ryegrass; the natural grasses have not been much attended to, although there is a great variety of them in the district. Upon grass lands, however, after the first two years, the natural grasses come up and make a very close sward.

Wood.—It is to be regretted that so few attempts have been made to raise wood in this district, when it is considered that woods and forests abounded in it at a former period; and although the climate may have been afterwards changed, in consequence of the large tracts of moorish soil, and moss and stagnant water, which the overthrow of these woods and other causes had occasioned, still, in consequence of recent improvements in drainage and enclosing, and a general advancement in the state of agriculture, the soil and climate have been considerably improved. An opinion seems to have been formed, that it was impossible to raise wood near the sea, on the east coast of this district, and this opinion is still so common and so deeply rooted, as to prevent such attempts to any extent.

From the large trunks of trees, especially of oak, birch, and ash, which are found in the mosses near the coast, it is proved, that, at some former time, these trees grew and throve there, even although in the vicinity of the sea. The oak trees have been preserved by the moss so completely, that, when

dug up, and carefully and slowly dried, they are fit to be made into pieces of furniture.

The mosses are prejudicial to the climate, especially when full of stagnant water, rendering the neighbourhood subject to the mildews which are there generated. On the east coast, the easterly and north-easterly storms are very prejudicial to the growth of trees in the neighbourhood of the sea, in consequence of the quantity of saline matter, which is carried by the wind to a considerable distance, blasting, blackening and destroying the leaves, as if a slight fire had gone over them. It is some time before the trees recover, and in consequence the young wood is checked in its growth, does not come to maturity before winter, dies, and requires to be cut off next spring. The ferruginous crust, or pan, is also prejudicial to the growth of trees, as in many cases, when the roots of the young trees reach it (especially if it be near the surface), they either die or become stunted. Near the sea, the bad effects of the storms might, in some measure, be obviated,—*1st*, By pretty high dikes; *2dly*, By planting in considerable clumps or belts, so that one part would afford shelter to another; *3dly*, By raising the plants upon the same soil, and in the same climate, in which they are to be reared (for trees, reared in a rich soil and better climate, cannot be expected to thrive in a situation poorer in soil, and worse in climate); and, *4thly*, By planting hedge-rows of gorse, thorn, broom, willow, or other hardy plants, to afford shelter. From the clumps of wood raised at Alehousehill, the old Castle of Inverugie, on the estate of Balmuir, at Grange and Invernettie, all on the east coast, and from other attempts that have been made, no doubt can remain that wood might be raised to a considerable extent, even on the most exposed parts of the district. Were wood to be planted, it would not only beautify the country, but also afford shelter and ameliorate the climate; and, in consequence, were the wood worth nothing, the loss of the land

occupied in planting, would be more than repaid, by the additional value of the land in the neighbourhood.

In planting trees in situations where there is a pan, and where it would be too expensive to prepare the land, by breaking it, the best method of proceeding might perhaps be to plant seedlings, in order that they might get naturalized to the soil and climate, and attain some vigour before reaching the pan; and in such case, although their growth would be impeded, the trees would in general ultimately penetrate the pan, and reach the subsoil. Every person is, or may be supposed to be aware, that, where it is intended to plant trees, the ground ought to be properly drained and enclosed; but notwithstanding, this, although essentially necessary, has sometimes not been sufficiently attended to. If clumps and belts to the extent of an acre or two each, were planted in proper situations, the appearance of the fine fields, in many parts of this district, bare and bleak when the crops are removed, would in a very short time be much changed to the better, as well as the general aspect of the country improved.

A laudable example to those places is afforded by the plantations at Pitfour, Aden, Crichtie, and Cortes, especially the latter, which is situated upon the east side of the Hill of Mormond, and where the ground planted is in many places of an inferior and moorish quality. This wood was planted by John Gordon, Esq. advocate. It was supposed by many that the attempt would prove abortive; but the wood is now thriving, and very considerably advanced.

Upon the banks of the Ythan and Doveran, and in the interior of the district, the soil, climate, and other circumstances, render the rearing of wood a matter of less difficulty.

From the trials that have been made near the coast, oak, birch, Scots fir, larch, ash, alder, sycamore, mountain-ash, poplar, and beech, especially the first four, seem to stand the climate best.

Agriculture.—After the district had begun to be opened up

by the turnpike roads, and the other roads improved by the funds levied in lieu of the statute labour, a better system of husbandry gradually superseded the former. The alternate system was gradually introduced, the lands were let under improving leases, and the tenants bound to a regular system of management and rotation of crops,—the lands were drained, and in many places enclosed,—better houses and steadings were built,—the old distinctions of infield, outfield, laigh, faugh, &c. were laid aside,—and one mode of management and cropping adopted for the whole farm. The late Mr Ferguson of Pitfour, M. P., was among the first to lay down a regular system of management for his tenants. And although his rules and regulations were in some particulars very strict and severe, yet, in his hands, the tenants had no cause for complaint; but, on the contrary, their interests were promoted, while the country was assuming a very different aspect under their cultivation.

After being carefully drained, enclosed, and prepared, Mr Ferguson laid down to grass a considerable part of his extensive estates. These grass parks were let annually to the dealers in cattle; and, while the land was getting into a better state by being pastured upon, the rents were fully more than could have been obtained from the same land, had it still continued to be farmed. Although Mr Ferguson thus took a very active part in introducing an improved system of agriculture into Buchan, yet he was not the only proprietor who did so; others went along, while all soon followed, in adopting such regulations, as to promote the improvement of their estates, while they bettered the condition of the industrious tenants.

The crops principally produced in Buchan are oats, bear or bigg, barley, beans, turnips, potatoes, pease, and grass. In some places wheat has been tried with various success. The soil seems adapted for producing it, but the climate is rather too cold, and it is rather late in coming to maturity. Farther trials are now making, and there is little doubt that

wheat will soon be more cultivated in this district than it has hitherto been *.

* Swedish turnip or rutabaga is very generally and successfully cultivated in the district of Buchan, and mangel-worzel has lately been introduced on a small scale. Potatoes are largely cultivated, and of excellent quality. Many cargoes are shipped annually at Peterhead and Fraserburgh for England. Turnips are sown during all the month of June. From the 5th to the 20th of that month, is considered the best season.

Harvest of grain crops generally commences about the last week of August, or first week of September.

The exports from Peterhead during last year were,

Grain,	19,965 quarters
Meal,	4,874 bolls.
Pork,	152 tons
Butter,	125 ...
Cheese,	29 ...
Eggs,	125,200 dozens
Potatoes,	3,113 bolls

The value of the grain cannot be estimated under	L. 26,000	0	0
... .. pork,	4,000	0	0
... .. butter,	8,000	0	0
... .. eggs,	2,000	0	0
... .. potatoes,	800	0	0
... .. cheese,	800	0	0
	L. 41,600	0	0

It may be assumed that not above one-third of the produce of Buchan is exported from Peterhead, and perhaps not above one-fourth, for taking into consideration that this port is at a considerable distance from the greater part of the district, the ports of Newburgh, Fraserburgh, and Macduff, must be much more convenient for exportation. But taking the exports from Peterhead at one-third of the exports of the district, the sum would be, L. 123,000 0 0

There are fifty markets on this district for the sale of cattle, and in Aiky fair alone, cattle of the value of L. 12,000 are sold; and taking this as one-fourth of the whole, there would be	50,000	0	0
For cattle, besides the value of fish,	L. 173,000	0	0

There may be about 60,000 barrels of herrings exported annually, as there are generally upwards of 300 boats employed. The salmon and white fish exported must be of considerable value.

The rotations are different, according to the situation and nature of the soil. In the neighbourhood of towns and villages, a fourth course shift is generally adopted, viz. one division yearly in fallow, turnips, or potatoes, sufficiently manured; one division in oats, bear or barley, laid out with grass seeds; one division in hay, or pasture, and one division in oats; or, 1st, potatoes from second year's grass; 2d, bear and grass seeds; 3d, first year's grass; and, 4th, second year's grass.

A little farther from towns and villages, a five shift course is frequently adopted; 1st, turnips and potatoes; 2d, oats, bear or barley and grass seeds; 3d, hay; 4th, pasture; 5th, oats from second year's grass;—and sometimes a sixth course shift, viz. 1st, turnips; 2d, bear and grass seeds; 3d, hay; 4th, pasture; 5th, pasture or oats; and 6th, oats. In the country, the most approved shift is a seventh course shift; 1st, turnips or other green crop; 2d, bear or oats, and grass seeds; 3d, hay; 4th, pasture; 5th, pasture; 6th, pasture; 7th, oats, or, in most cases, where manure can be procured, two crops of oats are allowed after three crops of grass.

The farms are laid out into regular and nearly equal sized fields, or divisions, to answer the rotation agreed upon, so as the tenant may have the same extent of each sort of crop, each year of his lease. Where the quality of the soil, and the state of improvement will admit of it, an extra field near the steading is very commonly laid out to permanent pasture.

The lands are, in many parts of the district, well drained. The under water is carried off by sunk drains, of such a depth and with such a size of an eye, or waterway, as may be necessary to carry off the water. The waterway is built on both sides, causewayed on the bottom, and covered with stones. The drain is then filled up within a foot or 15 inches of the surface, with small stones gathered from the land, and covered with sod, turf, or straw, or whins, and then the earth or mould is filled in. In many parts of this district, where

the subsoil is a retentive clay, or a retentive and ferruginous subsoil or pan, surface ditches or drains are of great importance, and are made to answer the double purpose of a fence to enclose the fields, and a conveyance for the surface water, which would otherways remain upon the land, render it cold and sour, and destroy the best parts of the manure. If these ditches are kept properly scoured, and if the ridges are laid off in such a way as to give the furrows an inclination into one of these ditches, the water no sooner falls than it is carried off. These ditches may be either single or double; if single, the stuff, in casting the ditch, is thrown to one of the sides, and made into a fence, by being faced up with a stone-dike from the bottom of the ditch; or thorns are planted in the face of the mound raised from the stuff thrown out of the ditch; if double, then the stuff is thrown from each ditch into a mound between them, and planted on both sides with thorns. The size of a ditch of this sort is generally 5 feet wide at top, $2\frac{1}{2}$ feet deep, and sloping equally on both sides to about 9 to 12 inches at the bottom. A double ditch and sunk occupy 18 feet, 10 feet for the ditches and 8 feet for the sunk; but large as this extent of land is, it is of no consideration when taken in comparison with the benefit derived from keeping the ground clear of surface water.

In some situations, where such drains are either unnecessary, or where the water is carried off by under drains, and in places where earthen mounds would be inconvenient; for instance, in parts laid down to permanent pasture, stone-walls have been built, generally $3\frac{1}{2}$ feet in height, with a coping of large stones. In reclaiming waste lands, which abound with stones, the building of such walls affords an advantageous mode of getting rid of the stones at little expense.

Manure.—Keeping in view the various rotations that have been mentioned above, it will be seen that one field in rotation is manured each year, and that field is the one in green

crop, consisting of turnips, potatoes, kail, or other crop of the same kind ; but besides the turnip field, it is by no means uncommon to give the lay a top-dressing of some sort of manure before breaking it up, especially if two white crops are allowed to be taken after lay. Beside the farm-yard dung, the tenants upon the coast side, use the sea-weed or wrack cast on shore, the shell sand, where it is to be found, the guts and other refuse of the herring fishery, the shells, ashes, and other matters in the fishing villages and towns along the coast, and the refuse of the blubber brought from the whale-fishery.

The sea-weed is a manure which will answer with any soil, and should be ploughed into the land as soon as it may be after it is laid upon it. It may be used with great advantage for decomposing moss or sward, or too rank dunghills. The shell-sand is preferable to lime, upon moss sward, and is of considerable benefit upon strong clay soils. The herring refuse is an excellent manure for turnips. One cart-load of it will make ten loads of compost with moss or mould ; and as these are to be found upon almost every farm, there is a great saving of carriage. By the use of such compost, the land in the neighbourhood of herring-fishing stations has been much improved ; the guts and heads of fishes, and other garbage about the fishing villages, a great part of which was formerly thrown into the sea, are now carefully preserved and sold as manure. The whale refuse is used in the same manner as the herring refuse, but does not make such a good manure.

Bone-dust has of late been used to a considerable extent, and, when it is of good quality, answers well for turnips upon light soils of all kinds, but has little effect upon strong clays.

Lime is used to a great extent, and with advantage, except upon the strongest clay soils, where the quantity required to be used would cost more than the farmers could afford to lay upon it, with the prospect of being repaid. Where lime is used, from 25 to 30 bolls are laid upon the Scotch acre, al-

lowing two heaped imperial bushels to the boll. The greatest attention is paid to preserve the dung and urine made from the cattle upon the farm.

Size of Farms, Rents, &c.—The greater proportion of farms in this district are in size from 50 to 100 acres, the first wrought by two, and the last by four horses. There are others, from 100 to 300. Very few exceed 300. The rents of land in this district are very different, according to soil and situation. In the neighbourhood of Peterhead and Fraserburgh, small lots are let for from L. 4, 4s. to L. 7, 10s. per acre; at a little greater distance, at from L. 2, 10s. to L. 3, 10s. The grass-parks before mentioned, in the neighbourhood of Peterhead, lately belonging to Mr Ferguson of Pitfour, now to Mr Morrison of Auchintoul, have been let on leases of five years, at from L. 3 to L. 5 per acre, Scots measure. Along the coast, and in the interior, the rents are generally from L. 1, 10s. to L. 1 per Scotch acre. Some inferior lands are from 10s. to 15s. per acre. These rents are high; and, in order to enable the farmers to pay them, a superior mode of cultivation is required.

The tenants in Buchan are not surpassed by any of their neighbours in activity, intelligence, or perseverance. They are good farmers, and their farms are in general in excellent order, well drained, well cleaned, and well manured. But although this is the general state of the district, upon particular estates, a great deal remains to be done; and, in every instance, by perseverance in good farming, the value of the land, and its productiveness, will be greatly increased. At present the highest returns in the neighbourhood of towns may be stated at from 10 to 12 bolls, Old Aberdeenshire measure (8 to 10 quarters Imperial), per acre. Upon well cultivated farms, the returns may be stated at 7 to 8 bolls; and, taking the whole district, perhaps 5 or 6 bolls may be stated as a fair average.

The steadings are in general built of stone and lime, and covered with slate, tile, or thatch, and exhibit a degree of comfortable accommodation equal to those in any other district in the county.

There is nothing peculiar in regard to the implements used in the district. Small two-horse ploughs, Finlayson's rid plough, the iron-grubber, rollers of various kinds, angled harrows, trench ploughs, levelling-machines, turnip sowing-machines, bone-dust machines, and carts and waggons, all of good construction, are in common use. Very few farms are without thrashing-machines, driven by wind, water, or horse.

Cattle.—The cattle in Buchan are chiefly of the short-horned kind, not very large, but short-legged, and hardy. A strong prejudice exists against the long-horned kinds. The breed of cattle in Buchan is peculiar to itself, well known, and generally esteemed for its quality, and the beef it produces. From the great extent of grass-lands in Buchan, more cattle are produced in it than in most other districts. They are generally bought by dealers from the south, when two, three, and four years old. The oxen, when about four years old, weigh from 45 to 50 stones Dutch. The cows in Buchan are not large; but, from the excellent quality of the pasture, they yield a considerable quantity of milk, from the cream of which butter is made to a great extent, and of excellent quality. It would be no easy matter to make a correct estimate of the value of cattle sold from this district. In the course of the year there are about fifty markets held in this district, for the sale of cattle, and the amount of sales in Aiky Fair annually may be estimated at upwards of L. 12,000.

Of late, some extensive farmers have introduced the pure Ayrshire and Teeswater breeds of cattle. Cross-breeds of these with the native stock, have also been tried with apparent success. It will be some time, however, before the ad-

vantages to be derived from these new and cross breeds can be ascertained.

The horses in Buchan are also a native breed, not large, but of good symmetry, and capable of undergoing considerable fatigue. Many farmers have introduced the larger breeds from the southern districts, and have crossed them with the native breeds, with considerable advantage. The greater part of farm-work is done in this district by horses, but oxen are, in many instances, used in ploughing.

There are very few flocks of sheep to be seen in Buchan.

Leases.—The leases in this district are generally for 21 years. Assignees are excluded. The tenant is allowed to sublet the whole farm, he remaining bound that the conditions of the lease shall be implemented. The proprietor reserves one acre in forty for planting clumps and corners, the right to straight marches, and excamb lands with neighbouring proprietors and contiguous tenants. He reserves mines and minerals, with liberty to work them, and to make roads, on paying surface damage; and the right to kill game, allowing the tenant indemnification for the injury done to his crops. In some cases, the tenant is bound to drain the farm, enclose, and subdivide it into fields, to answer the rotation agreed upon. In other cases, and which appears preferable, the landlord agrees to take upon himself these improvements, and to make roads, at his own expense, charging the tenant a certain percentage on the expenditure, generally one per cent. above the current interest at the time, and leaving him, by these means, in possession of his capital, which will be employed in the improvement of his farm.

The ditches and fences are, in some cases, to be cleaned, repaired and scoured under the direction of the landlord, and by persons employed by him, and one-half of the expense is charged to the tenant, and the other half paid by the landlord; in other cases, the tenant is taken bound to perform

these services. Should a field for perpetual pasturage be judged necessary, the tenant agrees not to break it up. The rotation is fixed, and is, as before stated, such as is best adapted to the situation of the farm and nature of the soil. The treatment of the fallow-field and quantity of manure it is to receive, are fixed. Where the nature of the soil requires it, the tenant is bound to trench with the plough. This is of great importance, where the subsoil is a ferruginous crust or pan, for until such pan is broken, the soil is not capable of being well improved. The rights of the outgoing and incoming tenant are fixed. The incoming tenant is bound to purchase, and the outgoing tenant to sell, the last crop and dung upon the farm at the term of removal. The first year's grass is paid for by the incoming tenant, and the pasture-grass is left without payment. The incoming tenant is allowed to sow grass-seeds with the outgoing crop. If the tenant build the steading, he is either allowed a year's rent for the walls, one-half of which is paid when the steading is finished, and the other half at the expiry of the lease, and is paid for the roofs, doors and windows, at his removal, or allowed to remove them. If the landlord build the steading, he charges, along with the rent, the interest of the sum expended. In most cases, the tenant is bound to bring into cultivation, within a certain period, all the waste land upon the farm, capable of being cultivated by the plough: and if the landlord shall trench such parts as cannot be cultivated by the plough, the tenant agrees to pay him the interest of the sum expended.

Such are the leading conditions of the leases, which are enforced by additional rents and penalties, and while these conditions are adhered to, the soil must progressively improve, and become of more value, and very considerable additions be made to the extent of the arable lands. In order to enable the tenant to cultivate the lands in a proper manner, all permanent improvements, such as houses, roads, drains, fences,

should be made by the landlord, and the interest, or an additional rent, be paid by the tenant.

Fisheries.—The fisheries carried on along the coast of Buchan are very valuable, and might be much extended. Cod, ling, haddock, mackerel, crabs, lobsters, whittings, grey-fish, salmon, sea-trout, and herrings, are those chiefly caught. The whale-fishery is carried on extensively by the inhabitants of Peterhead, and affords employment to many seafaring people. The offals or refuse of this fishery add considerably to the means of improving the soil.

The herring-fishery is carried on to a great extent. The light-houses on Buchanness and Kinnairdshead are of great consequence to the fishermen while prosecuting their trade, especially while carrying on the herring-fishery. Peterhead and Fraserburgh are the principal herring-fishing stations on this coast. Hitherto Fraserburgh has engrossed almost the whole of this trade, but of late it has been carried on at Peterhead, although to less extent than at Fraserburgh, yet with equal if not greater success. During the present season the boats at Peterhead have averaged from 270 to 280 crans each. The curers find that the fish are large, and of superior quality, which they attribute to the strong tides. There can be little doubt, that many curers who at present go to Wick and other places to the north, will be induced to try the fishing at Peterhead and other places on the coast of Buchan. The extensive harbours of Peterhead, and the small harbour lately erected at Boddam, close to the Buchanness lighthouse, are calculated to afford good accommodation to those engaged in the herring-fishery. It is a fact worth noticing, that the Dutch have, for a long time, made their earliest fishings off the Buchanness; and the fishermen report, that herrings are occasionally to be seen upon this part of the coast at every season of the year.

In conclusion, Buchan, although much exposed to the northerly and easterly storms, in most places destitute of shelter, and with a soil and climate inferior to the districts south of the Grampians, has, from the intelligence of the farmers, the encouragement given by the landlords, and the judicious regulations laid down for the improvement of their estates, made great progress in improvement. During the last thirty years, its produce has been more than doubled, while the comfort and prosperity of its inhabitants have proportionally increased. The district enjoys the advantage of extended intercourse. Numerous carriers traverse it in all directions. Coaches run on all the turnpikes. From Peterhead, where, a dozen years ago, no coach was to be seen, four coaches now start daily, two for Aberdeen, one for Banff, and one for Fraserburgh.

Much, however, yet remains to be done. Farm-roads are still in many instances wanted, and without these, improvement cannot be carried on to advantage. The nature of the soil is such as to require to be completely drained and kept free of surface-water, before manure can be applied with advantage. The hedges, fences, and drains, must be constantly attended to and kept in order. Attention must be paid to manure, without applying a sufficient quantity of which, all previous labour is in a great measure lost.

If proprietors grant adequate encouragement for cultivating their waste lands, and by planting wood, afford shelter and improve the climate, and, if the rents are such, that while they stimulate the tenant to improve, they afford him at the same time a reasonable chance of remuneration, there can be little doubt but this district will continue to improve in beauty, value, and importance.

ESSAYS ON THE DISEASE IN SHEEP CALLED THE LOUPING-ILL.

[The Society having offered a premium for a statement of well authenticated facts relative to the disease in sheep known in the border districts by the name of Louping-ill, two Essays have been received, differing essentially in respect to what the authors suppose to be the nature of the malady in question. One of the writers considers the disease as constituted by a loss of balance in the circulation, arising from general debility and the action of cold, the blood being repelled from the surface and forced upon the heart and other internal organs ; while the other, finding that it exhibits most of the symptoms which paralysis assumes in the human body, considers it as a nervous disease, analogous to, or identical with, that just mentioned. Bleeding and the warm-bath are the remedies proposed by the former ; while the latter places little confidence in any known remedy, having found the preventive treatment the only means of ensuring safety from the attacks of the disease.]

ESSAY I. *By Mr WALTER TOD, Longhope, near Hawick.*

THE author of this essay, conceiving that observation and experiment are the only means by which we can obtain a knowledge of the laws which regulate the phenomena of nature, drew up a list of queries, embracing every thing that could be supposed to operate as a cause in producing the disease in question. He then visited the various districts in Scotland in which the disease is most prevalent, those in which it is rare, and those in which it is altogether unknown. The

general results of the answers given to the questions proposed by him are the following :—

Foul pasture produced by overstocking, is the most frequent and most powerful cause of the disease. Young sheep which feed much upon small spots of sweet ground, are extremely apt to become affected ; and sheep in low condition, from whatever cause, are peculiarly subject to the disease. A bad summer, a severe winter, and cold weather, accompanied with easterly winds, in the end of April and beginning of May, are productive of the disease. Sheep in low condition are not so apt to die of the disease, at the lowest point to which they sink, as when they begin to mend. The nature of the breed has much influence, the purer it is it being more liable to the disease, which was almost unknown before the introduction of the fine breeds. The first appearance of the disease is generally sudden, and is often immediately followed by death, the animal leaping from the ground and falling dead on the spot. In other cases, the disease comes on gradually : the animal is frequently seen trembling before the attack. It then staggers, loses its balance, falls, and becomes unable to rise, from paralysis of one or more of its limbs, generally the hind ones. In this state it often remains for a considerable time, and then dies ; but if the attack be moderate, and the weather mild, recovery may take place, although it rarely does so.

These are the most important and the best supported facts obtained from a rigorous examination of numerous witnesses. The following morbid appearances were ascertained by extensive dissection : The flesh is white, but free from any appearance of disease. The stomach and intestines are apparently in their natural state ; but the liver, lungs, and especially the heart, are gorged with blood. No effusion of blood is observed in the brain, but the large arteries there, as well as in most of the internal organs, are full of very dark blood, which resembles thick currant jelly. In all cases the heart was

much distended with this kind of blood. Nothing can exceed the uniformity which the morbid appearances display on dissection, the author having found them precisely similar in the numerous sheep, lambs, and cows which he opened.

From these circumstances, the theory of the disease seems obvious. If sheep, after a bad summer, followed by a severe winter, sink to the lowest point of debility when the new grass begins to spring, about the end of April and beginning of May, when cold easterly winds generally prevail in this country, the state of exhaustion to which they are reduced seems to constitute the essence of the disease, by causing a want of balance in the circulation. The penetrating cold of an east wind, acting upon the surface of sheep in the reduced condition supposed, must have a direct tendency to repel the blood upon the heart, lungs, and other internal organs; and such we find to be the case upon dissection. The instant death of the animal, under a severe attack, accords also with this view of the disease; for when the heart is suddenly and violently distended, its power of contraction is diminished, so that the blood cannot be forced into the large arteries, and instant death must be the consequence. In less severe attacks, when the animal lingers for a considerable time under great oppression of the chest, and loss of voluntary motion in the limbs, by which this state of the disease is characterized, the explanation is equally easy. The oppression at the chest arises from the constant struggle of the heart to propel a quantity of coagulated blood which is gradually overpowering its diminished energies; and the paralysis of the limbs arises from the want of circulation in them, occasioned by the feeble action of the heart.

Such being the nature of the disease, the indication to be fulfilled is to restore the circulation by bleeding, and the application of warmth to the surface. The author has tried bleeding in the most severe cases, and always with complete success, in the early stages of the disease, but uniformly with-

out benefit in the more advanced stage. In May last, he bathed a great many lambs, labouring under the disease, in water heated to 96° or 98°, and always with success, when the animals had not been so long under the influence of the disease as to be irrecoverable. In two or three very severe cases, the lambs, which were labouring under great oppression of the chest, and difficulty of breathing, had not been in the bath more than a few minutes, when these symptoms were considerably abated, and, in ten or twelve minutes, the breathing became soft and perfectly natural.

In endeavouring to prevent the occurrence of the disease, the farmer should ascertain, with as much accuracy as possible, the exact quantity of stock which his ground is capable of sustaining in good condition. The error of overstocking is attended with two powerful causes of the disease in question: it reduces the food to too small a quantity, and deteriorates the quality of the diminished quantity. Suppose sheep, under the influence of these causes, to be exposed to a wet summer, a severe winter, and a cold backward spring, and what must be their combined effect upon the animal system? Animals in the feeble condition thus induced, if exposed to the cold easterly winds that often prevail in the end of April and beginning of May, must be extremely liable to have the balance of their circulation destroyed, and thus the disease is produced. Here, then, the farmer has at least one powerful means at his command of preventing the disease.

In the next place, the shepherd ought to use the greatest care in preventing all disturbance of his flock; for sheep that frequently run together when alarmed by dogs, or under annoyance of various kinds, are not only occasionally overheated, but are prevented from feeding and ruminating in a regular manner, and are thus liable to fall off, and, in consequence, to become subject to the disease in question, as well as to others.

There is another preventive of great importance, which is,

that the flock be accustomed to feed regularly over the whole ground. On some farms, where there are spots of very sweet pasture, the danger is very considerable, as young sheep especially are extremely apt to confine themselves to these spots, to the neglect of the coarser pasture, which is so necessary for maintaining a healthy action in the stomach and bowels. Many intelligent farmers agree in stating, that they have suffered great loss from the negligence of their shepherds in this respect, the young sheep which feed on these spots being extremely liable to the disease. The preventives then are: a regular and well-timed supply of wholesome food, obtained with ease, quiet, and shelter, and great care in the general management. From all that the author has been able to learn from his own experience, and that of others, these means will prevent any stock from becoming the prey of the fatal disease in question.

There are two points which have been much agitated; the nature of the soil and the climate. One half of the witnesses examined affirmed that they believed the nature of the ground to be the great origin of the disease, while the other half asserted with equal confidence, that the nature of the ground has no influence whatever. In this dilemma, recourse was had to a new query, viz. Whether the disease was ever known to appear and disappear at different periods, under different management, upon the same farms? The invariable answer was, that no fact is better established than that the disease appears and disappears on the same farms at different periods. This fact, then, is incompatible with the idea, that the disease may be produced by any latent or inherent quality in the soil. If in some lands the disease is more prevalent than in others, the disease is there induced by the want of that due mixture of coarse and fine pasture which is necessary to maintain the stock in good condition, at the different seasons of the year, or by the operation of some of the causes already mentioned.

The only other point that requires consideration is the influence of climate. If the view of the disease given above be correct, it would follow that elevation above the level of the sea is not so injurious as sudden and violent changes of temperature, or long exposure to the chilly influence of easterly winds. In fact, there are reared upon the most mountainous districts of this country sheep of excellent quality, which are less liable to various diseases than those that graze on lands of less elevation. So far as the disease under discussion is concerned, the influence of a variable climate is very manifest. That cold which is produced by the sudden condensation of the vapours which are exhaled from marshes, lakes, stagnant pools, and peat-bogs, by the heat of the sun, is by far the most powerful in producing the disease. It checks the insensible perspiration, contracts the vessels of the surface, and ends in upsetting the balance of the circulation. That such is the process seems evident from the fact, that the animal is often observed shivering before the attack, like a person in the cold stage of intermittent fever, which is known to arise from the same cause. But the frequent condensation of vapours produced in the manner just mentioned acts also as a disposing cause, by blighting the pasture, and thus reducing the condition of the stock. It is an admitted fact that stock under the influence of such a climate are most liable to the disease; and there is no remedy in this case but draining, which has been known to effect the entire disappearance of the malady.

Long exposure to cold, however produced, will always be fatal in proportion to the condition and circumstances of the stock. Sheep after yearning, for example, are more liable to the disease, than before. The new point of circulation established during gestation being suddenly removed, a greater quantity of blood is thrown upon the heart and lungs; and if at this time the animal is exposed to cold, by which the blood is expelled from the surface, nothing is so likely to happen as a loss of balance in the circulation.

ESSAY II. *By Mr ROBERT LAING, Shepherd, Conchra, Lochalsh.*

THE Louping-ill, which is a nervous disease, usually commences suddenly, and is accompanied with the loss of sense or of motion, often with both. The symptoms vary considerably; but are all of a nature indicative of paralysis or some affection of the brain or nerves. Thus, in some cases, the animal has a strange look, lifts its feet high, is quite regardless of obstacles that occur in its way, and when disturbed runs in any direction apparently without choice. Some carry the head high, like a horse checked by the bridle; others carry it low like a foxhound on the scent; while others have the neck twisted, and the head turned to a side, or have one side of the head directed upwards. Sometimes the hind legs are drawn below the body, or are dragged behind, as if the animal had its back broken. When a whole side is affected, the animal falls and thrusts out its feet; often also it lies on the ground, works with its head and feet, foams a little at the mouth, and shews strong symptoms of convulsion, or stands still, hangs the head, droops the ears, and shews a dull melancholy look. In some cases, the animal is suddenly seized with the disease, falls instantly to the ground, and never rises again.

The lands most subject to the disease are those of a dry and barren nature, the vegetation of which is hard of digestion, or chiefly of one kind, without a due mixture of marshy or meadow land to afford spring food, and particularly those with a southern exposure, and on which the grass becomes dead earlier in spring, and allows the stock to get into low condition before the new supply comes to relieve them. I cannot affirm that any soil is quite exempt, as the disease may be induced by occasional causes; but I am inclined to believe that a great proportion of land, if properly managed, will be free of the disease, provided it afford variety of pasture, together with a sufficient quantity of spring food.

The season at which the disease is most prevalent is from the 1st to the 25th of May, although it may commence as early as March, and continue until June. It usually commences with the coming of the new grass, and continues until the sheep begin to improve in condition, and to be less affected by the change from dry to succulent food. Much, however depends upon the state of the weather ; for, if the wind blows from the north or east, accompanied with showers of hail or sleet, it has a great tendency to increase and continue the disease.

When a stock is removed from clean to foul land, that is, from land not subject to the disease, to land on which it occurs, it never fails to suffer more severely the following spring than stock bred upon the land. This may easily be accounted for. In the first place, from the natural desire which the animals have of returning to the place to which they have been accustomed, it is necessary to confine and watch them more closely, by which the ease and comfort so necessary to health are destroyed ; and, in the second place, they labour under great disadvantages from being strangers in the land, and not knowing the most productive spots. They thus fall into low condition, when in spring they again experience the desire of returning to their accustomed haunts, betake themselves to the point at which they expect to make their escape, and finding themselves disappointed, become languid, and eat only so much as to alleviate the pressing calls of hunger. Their stomach becomes disordered, their bowels constipated, their spirits depressed ; and hence arises the disease, which sometimes commits great havock. In one instance I was witness to so great a mortality produced by it, that carts were employed to carry the dead from among the living.

The most successful preventive that I know is giving turnips in winter, and sown grass in spring, until the natural grass is sufficient to support the stock. Many have succeeded in mitigating, and not a few in extirpating, the disease, by

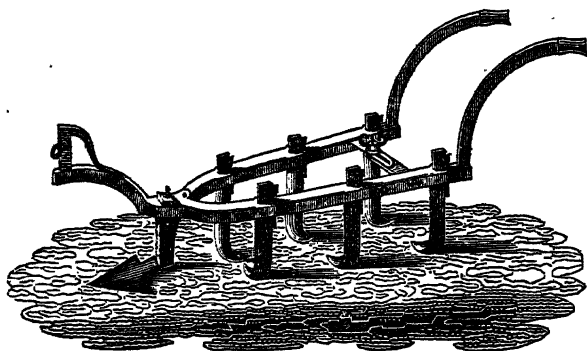
opening up improved land, and allowing their sheep to pasture on it during the months of March and April. When nothing but hill or natural pasture can be procured, the stock ought to be gently moved round their boundaries, in search of different kinds of food. They should not be allowed to linger too much in one place, as indolence is injurious, while, at the same time, gentle treatment is absolutely necessary.

The disease is most prevalent in lambs that are badly nursed, and in ewes that are much reduced by nursing their lambs in cold and backward seasons.

The Louping-ill is a disease that seldom admits of cure when once fairly established, as it never fails to leave some dregs behind, by which those that survive the shock are rendered unfit to rank among the stock, or appear in the market. In fact, the only method by which benefit can be obtained, is the prevention of the cause of the disease, which, in my opinion, originates in the internal parts, in consequence of food of too difficult digestion. In the course of thirty years' experience, I never found the louping-ill prevail where a sufficiency of nourishing food, such as turnips and sown grass, could be obtained, unless produced by occasional causes. I have long been decidedly of opinion that the louping-ill is the same disease as paralysis in the human body, as I never observed a symptom in the one which I have not also seen in the other.

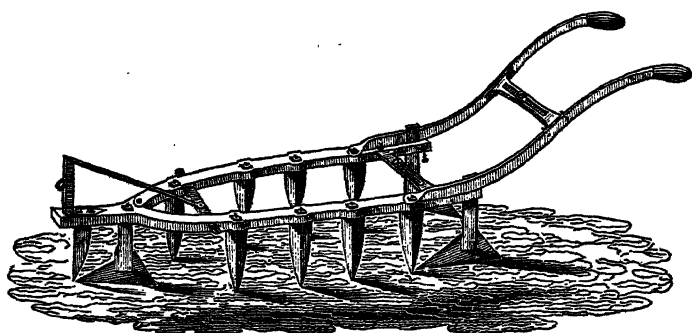
DESCRIPTION OF CERTAIN HORSE-HOES FOR TILLING THE
INTERVALS OF DRILLED GREEN CROPS.

THE Hawick Farmer-Club has presented to the Highland Society a model of an iron horse-hoe for tilling the intervals of drilled crops. Instruments of this particular form have very recently, it appears, been introduced into that part of Scotland. That of which a model has been transmitted, consists of a share in the centre before, with three coulters on



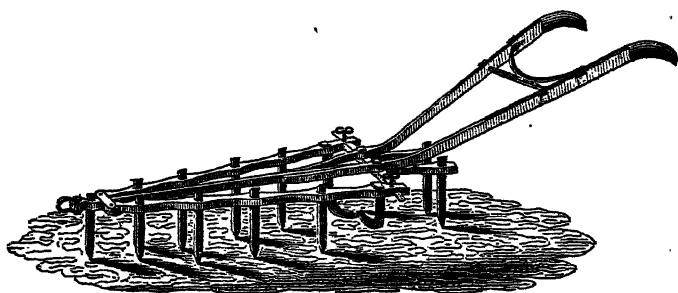
each side curved inwards. There is a joint on the right side beam, a little behind the fore share, by means of which and the cross bars shown in the figure, the side coulters may be set wider or closer, according as the size of the drills may require. The share, which goes in the middle before, cuts all the root-weeds within its own breadth, and the curved coulters behind cut all the root-weeds on either side, which are without the breadth of the centre share.

Instruments, however, of this kind are now pretty generally diffused over the country, and have the advantage of simplicity of construction to recommend them. There are considerable differences in the form of their parts. The following figure is taken from one made by Mr Morton, agricultural implement maker, Edinburgh.



In this hoe the fore tooth is a coulter, and the one immediately behind it is a triangular share. On each side there are four straight coulters; and behind, on each side, there is a triangular share. The first share with the two hinder ones cover the whole ground, so as to cut all root-weeds. There is a joint on the right side, a little behind the junction of the beams, and by this and the apparatus between the handles and that before the hind shares, the coulters and hind shares can be set at any width that may be required to suit the drills.

Another instrument of this class is shown in the following figure.



Here there is one straight tooth or coulter before on the middle rod or beam, and there are four straight teeth on each of the side beams; and the fifth or hindmost coulter on the side beams are curved inwards, and of such a length that the points

of the two nearly meet. By this means the nine teeth before till the ground, and the two curved coulter going nearer the rows of turnips or other crop, cut up any root-weeds that may not have been torn up by the fore-teeth. Two short rods project below, one behind each handle, into which are inserted a tooth. The purpose of these two teeth is to spread or level the earth after it has been acted upon by the curved coulters. The lateral teeth can be set wide or narrow as may be required, by the expanding apparatus, as shown in the figure.

In this manner, a tooth or coulters in front, is substituted for a broad share, on account of the inconvenience sometimes occasioned by the latter in a very stony country, for which these instruments have been especially constructed. They are made by Mr Robert Brodie at Templebar, by Peebles. The above drawing was taken from a handsome model made by him. These machines weigh 110 lb. each, and are understood to have given much satisfaction in the light stony land where they have been used.

In the two first mentioned instruments, the power to allow them to go deep or shallow, is given by elevating or depressing the line of draught at the end of the beam. In the last instrument, this is done by only shortening or lengthening a chain which communicates between it and the horse-tree. The addition of the other apparatus, however, can be easily made.

DESCRIPTION OF A PORTABLE FIRE-ENGINE, INVENTED BY
MR RUTHVEN OF EDINBURGH.

MR RUTHVEN, well known as the inventor of an improved printing-press, and various useful machines, has recently obtained a patent for a portable fire-engine, on a new construction. One of these machines having been presented by Mr Ruthven to the Highland Society, and deposited in their Museum, the Directors have been so much satisfied of its uti-

lity, that they have directed an account to be given of it in the present Number of the Transactions.

A fire-engine of a portable size is of great utility and convenience. On the first appearance of fire, it is of the utmost importance to have an engine at work with the least possible delay, as an immediate application of a stream of water on the rising flame will often prevent a great deal of damage and ultimate trouble in subduing it. The fire-engines in common use require a considerable number of men to work them; and, from their cumbrous nature, the flame is often allowed to get to such a head, before they can be got to the spot, that great exertions are afterwards required, and considerable damage sustained, before the fire can be subdued. The size of the portable engine is such that it may stand in the corner of any apartment where a fire may be dreaded; or it can be conveyed from one place to another, by two persons, with the greatest facility; and it can be easily wrought in the smallest apartment.

It has been shown, from experiments made with portable engines, by an ingenious writer on this subject, M. Van Marum, that the art of extinguishing a violent fire with a small quantity of water, mainly consists in this,—“that the water be thrown on that part of the fire which is most violent, so that the quantity of steam produced, which suppresses the flame, may be the greatest possible; that water continue to be thrown on the neighbouring inflamed parts as soon as the fire has ceased in that in which the operation was begun, and that all the burning parts be visited in this way as quickly as possible. By thus following the flames regularly with streams of water, they may be everywhere suppressed before the part on which the operation was begun shall have entirely lost, by evaporation, the water with which it was moistened.”

M. Van Marum made an experiment on an erection of dry wood, forming a room 24 feet long by 23 feet wide, and 14 feet high, with two doors on one side, and two windows on the other, the inside strongly pitched and covered with twist-

ed straw, wood-shavings, and cotton soaked in turpentine. "Very soon after lighting it (he says), the flames being rendered more brisk by the wind, were every where so violent that it was considered by my assistants impossible to extinguish them. I succeeded, however, in little more than four minutes, and with five buckets of water, a part of which was wasted by the negligence of my assistants."

Hornblower also gave a proof of the importance and advantage of this class of engines for extinguishing fire. By an experiment made with an engine only 14 inches square and 2 feet high, he found "that four sides of a bed-room, all on fire, could be extinguished in a minute by little more than a pailful of water."

To produce the effect above stated, Mr Ruthven has constructed his engines so as that they may be used with *two* directors, or discharging pipes, from *one* engine, both acting at the same time. By this means, the water has the effect of *two* engines; and, to improve this advantage *more*, a finger of the hand which holds the directing pipe may be placed so far over the nozzle, as to make the water spread on the parts in flame as much as possible. The steam will thus be produced in the manner best calculated to effect the purpose required, none of the water being lost. And, as one cubic foot of water will produce 1700 cubic feet of steam, the importance of having the water regularly spread over the flame will be apparent. By this means, the atmospheric air, which alone feeds and increases the flame, is expelled.

Plate I., Fig. 1, is a perspective view of the engine in its working state. It is fixed at the bottom of a copper cistern containing the water to be discharged. The whole is carried by a hand at each end of the cistern, wherein also, when the engine is wrought by two men, each places his foot to steady it. Thus each pulling the upright rod alternately, with one hand to work the pumps, he directs a discharging pipe with the other, while his foot keeps the whole apparatus steady.

Fig. 1.

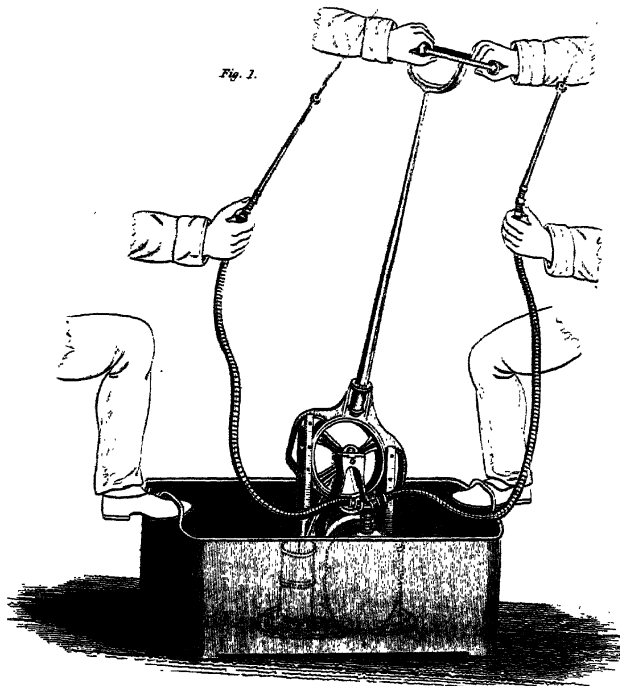


Fig. 2

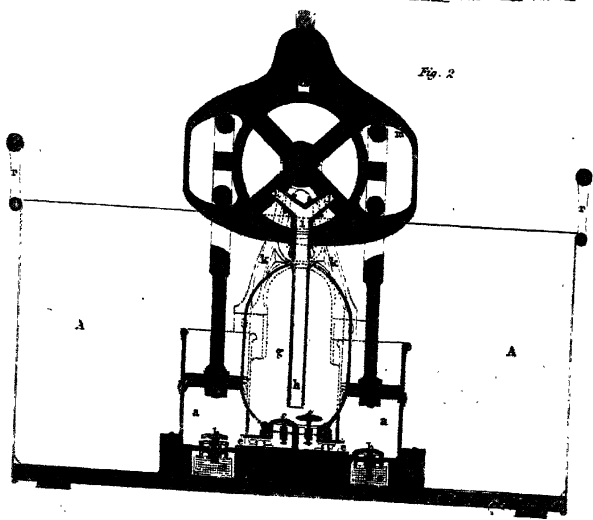


Fig. 2, exhibits a section of the engine, the parts of which are enumerated in the following references.

- A A The cistern to be supplied with water.
- a The cylinder, or pump-barrel.
- b A valve opening upwards into the pump.
- c The pump rod.
- d The piston.
- e Pipe from the pump-barrel to
- f The valve opening into the air-vessel.
- g The air-vessel.
- h Pipe through which the water passes from the air-vessel, communicating with
- i A three-way connecting pipe, for discharging the water by the two flexible pipes and directors.
- k The frame for supporting the movement.
- l Sections of a circle for producing the parallel motion with
- m The cycloidal curves.
- n n Friction rollers, attached to the pump-rod.
- o A cone in which the upright hand is fixed.
- p Bottom of the cistern for the water.
- q Four screw-bolts for fixing the engine in the cistern.
- r r The handles of the cistern.
- s Grating through which the water passes into the pump-barrel.

The manner in which the different parts of the engine co-operate, is as follows:—*a* is a section of the pump-barrel, in the bottom of which is fitted a metal valve *b*, so as to open inwards, and be air-tight when shut. This valve admits the water to enter, but not return. On the lower end of the pump-rod *c* is fixed a piston, fitting the barrel as perfectly as possible. On placing the bottom of the cylinder in water, or connecting it with a pipe placed in water, and drawing the pump-rod up, the water will rush up through the valve *b*, and on pushing down the pump-rod, the water cannot return by the valve through which it came, but is forced through a passage *e*, having a valve *f* opening into the bottom of *g*, the air-vessel. By forcing the pump-rod up and down, the water is made to enter the air-vessel, and the air in it having no exit, is compressed in the vessel to a certain extent. In the upper part of the air-vessel is fixed a pipe *h*, with the end of it reaching nearly to the bottom, through which the water is forced by the compressed air above it; the elasticity of the air thus producing nearly a uniform pressure, discharges the water in a continued stream, and not by an alternate force,

otherwise produced by working the pumps without an air-vessel. Although one pump-barrel may be used, two are adopted as giving a better arrangement for the power employed. When the engine is placed in a cistern from which the water is drawn, it communicates with the bottom of the pump-barrel as already described ; but if required on a large scale, the cistern may be detached. In this case the two pump-barrels are connected by one pipe, to which is attached a flexible tube, with a grating on the end (through which the water enters), to preserve the pump from injury, by hard substances drawn into it. Whenever this tube is placed in water, and the engine worked, the same result will take place as if the engine-barrels were in water. In this way *a large engine* may be constructed with only two barrels, air-vessel and working parts ; and these may be easily conveyed to a distance on a slight two-wheel carriage, with two or three men, and rendered instantly available with a few buckets of water.

The power in working the engine being applied horizontally, a much greater effect is obtained than in the common way of working engines ; and as, from the manner in which all the parts are constructed, the least possible friction is produced, the power is greatly increased. The valves are brass, without any leather or joints, and are of course not liable to get injury by use ; and the whole is constructed with the greatest regard both to simplicity and durability. All that is required is to have the trough filled with water, and kept in a convenient place for use.

This engine is well adapted for being kept on board vessels, for manufactories, warehouses, distilleries, mills, dwelling-houses, farm-offices, stack-yards and the like.

The same principle of working might also be usefully employed in any house or building for bringing water from a distance, and forcing it to the upper part. As the power is employed horizontally, the principle likewise might be applied to ship-pumps, by which, by means of ropes, any number of men could work that might be required.

NOTE RESPECTING A SPECIES OF AFRICAN HEMP, *recommended to the notice of the Society by A. HUNTER, Esq. Colonial Secretary and Registrar of the Settlements on the Gambia.*

OF the numerous plants possessing a fibrous structure, which renders them capable of being employed in the manufacture of ropes, thread, and cloth, while some, as flax and hemp, are extensively cultivated in the colder regions of the globe, others thrive only in countries where a high temperature prevails. The fibrous inner bark of many trees of various families, as well as the cortical layers of herbaceous plants, peculiar to the warmer regions of the globe, may in many places be procured in great abundance; and, were the attention of our colonists directed to this subject, it cannot be doubted that the result would prove highly beneficial to commerce. Mr Hunter, Colonial Secretary to the settlements on the Gambia, has addressed to the Society a communication respecting a kind of hemp, which promises to become an object of great importance. The anxiety which he has thus manifested for the prosperity of the colony, by soliciting attention to its productions, and his zeal in promoting its interests, merit the approbation of all to whom the extension of our resources is an object of solicitude.

Mr Hunter remarks that a gentleman of the settlement, in 1825 or 1826, made an experiment on the cultivation of African hemp, and sent a sample of about two tons to the London market. Although it was allowed to be of good quality, it was considered of too flaxy a nature to admit of taking tar. A pamphlet by Captain Harris, strongly recommending the cultivation and manufacture of certain fibrous plants in the colonies, excited a strong desire to promote, on an extensive scale, the cultivation and export of this article. His Majesty's government having also evinced an interest in the produce of African hemp, another sample of about half a ton was sent home; but this happening not to have been properly

prepared, doubts were entertained as to its qualities, and only part of it was recommended as fit for the use of his Majesty's navy. The government, however, were so satisfied of the value of the production, that they requested additional specimens to be transmitted.

With the approbation of the governor, an agricultural society has lately been formed, under favourable circumstances, not only for the purpose of cultivating hemp, but for the production of other articles of various kinds which abound on the Gambia, such as palm-oil, caoutchouc, &c. and which are of much value to the mother country.

With the view of encouraging the colonists in this laudable undertaking, Mr Hunter solicits the support of such societies at home as extend their premiums to articles of colonial produce; and, were their countenance vouchsafed, he is satisfied that it would tend to consolidate the mercantile interest, and would have the effect of securing the protection and encouragement of government.

The easy navigation of Gambia, the vast extent of country traversed by it, and the extreme fertility of the soil on its banks, fully demonstrate the extent to which an article of this kind might be cultivated. With respect to the *Phormium*, or New Zealand Flax, which, perhaps, possesses the property of tenacity in a higher degree than any other kind, he says the process of procuring it by manual labour is too tedious to admit of its being obtained in any considerable quantity, without the aid of machinery.

The species of hemp transmitted by Mr Hunter, which, however, he says is not that which the Agricultural Society intend to cultivate, but such as grows spontaneously all over the country, appears to be the inner bark of some ligneous vegetable. The sample laid before the Society is upwards of six feet in length, the fibres running entire the whole length; the colour is yellowish-white, with a slight gloss; the fibres are straight, somewhat rigid, of less tenuity than those of flax, and rather inferior in tenacity, although possessed of considerable strength.

ON THE AGRICULTURAL STATE OF CANADA AND PART OF
THE UNITED STATES OF AMERICA. *By ADAM FERGUS-
SON, Esq. of Woodhill.*

[*Extract from the Minutes of a Meeting of the Directors of the High-
land Society of Scotland, held the 3d February 1831 :*

The Hon. Baron Sir PATRICK MURRAY of Ochtertyre, Bart.
in the Chair.

THE Directors having been apprized by Mr Fergusson of Woodhill of his intention to visit Canada and the United States of America, it has appeared to them, that this may afford a favourable opportunity of obtaining such information regarding those countries, as may prove beneficial to rural economy and the useful arts at home. The zealous and valuable assistance which the Highland Society of Scotland has received from Mr Fergusson, as a Member and Director, and his knowledge and experience acquired in the long and honourable discharge of every duty of a country gentleman, afford an assurance to the Directors, that he will be eminently attentive to all such circumstances connected with the state of industry and the useful arts in the rich and magnificent countries which he is to visit, as may tend to promote the improvement of those arts in his own.

The Directors will therefore receive with the highest satisfaction such information as Mr Fergusson may from time to time communicate regarding the arts and natural productions of the New World, as well as on the subject of emigration, and the condition of the emigrants; and should he meet with associations similar to this Society in the purposes of their institution, the Directors authorize him to open up with them such a friendly intercourse as may lead to mutual good offices, and an interchange of useful information.

The Directors, in taking leave for a time of a gentleman with whom they have been so long associated in all the useful labours of this Society, and whose personal character and private worth they have so much cause to appreciate, feel it a duty to record their warmest acknowledgments for the long, assiduous and valuable assistance which he has rendered to the Highland Society; their anxious desire that he should soon again be enabled to resume the duties which he has so well fulfilled; and their cordial wishes for his success in the objects which he now contemplates by visiting the United States of America, and the Colonies of Great Britain.

The Chairman is requested to communicate to Mr Fergusson an extract of these minutes.

PAT. MURRAY, *Chairman.*

CHARLES GORDON, *Dep. Sec.*

HIGHLAND SOCIETY HALL, EDINBURGH,]
3d February 1831.

LETTER FROM ADAM FERGUSSON, ESQ. TO THE DIRECTORS OF THE
HIGHLAND SOCIETY OF SCOTLAND.

GENTLEMEN,

IN reference to a resolution of the Directors, which you did me the honour of transmitting to me, through your Secretary, upon the eve of my departure for America, I feel it now my duty to furnish some statements regarding the provinces of Upper and Lower Canada, with such portions of the United States as came under my personal observation, or regarding which I acquired information from authentic sources during my excursion.

Without reference to the precise route which I followed, my observations will point,

1. To Lower Canada;
2. To Upper Canada;
3. To the United States.

In treating of these, my leading object will be to ascertain their respective advantages or disadvantages to emigrants from Britain.

Lower Canada lies between 45° and 52° N. Lat., and 64° and 82° W. Long.

To those ignorant of the geographical position, there is something in the term *Lower* strongly indicative of a superiority in climate, which is by no means borne out by actual circumstances. Winter, in the Lower Province, wears a more severe and protracted form, than it does on the great table-land above. Many decisive facts in confirmation of this might be adduced. I shall only mention, that wheat cannot here withstand the severity of winter, requiring to be sown in spring, and occasioning thereby both loss and inconvenience to the farmer in wet and late seasons; while quails, or Virginian partridges, it may be observed, which abound in the Upper, are totally unknown in the Lower Province.

The soil is generally a fertile clay, which has hardly been yet brought, in any instance, to the test of what it may produce. It is generally occupied in small possessions, which continue, with the exception of some large seignories and church-lands, to fritter more and more away, from the absence of a check in the law of primogeniture, and a want of enterprize in the people, which might lead them to counteract this effect, by entering on new land. The population is chiefly French, and the religion Roman Catholic. The *habitans* are industrious, frugal, and contented; but their condition, to say the least, is almost stationary, and the habits or practices of their fathers are far too scrupulously revered. In person, they are rather good looking, especially the men; and to view them clothed in their home-spun drugget frocks, with a physiognomy of absolute content, peering from under the large hood so well fitted for a Canadian winter, is to obtain an assurance of unquestionable happiness and comfort.

The numerous orchards and abundance of fruit evince what steady and strong heat will produce, even with a winter of the most intense cold ; and while this supply contributes in a considerable measure to the wealth of the people, it adds in no small degree, with the aid of the sugar maple, to the enjoyments of a board in all respects plenteously furnished. The fine Island of Montreal is covered with orchards, and in every quarter they present themselves in rich luxuriance.

Notwithstanding, however, of these, and the many advantages which approximation to the sea-coast holds out, I should certainly not consider Lower Canada likely to realize the hopes of British settlers.

To many, the difference of religion, and scarcity of Protestant churches, will prove a drawback. To many more the preponderance of the French language, laws, and manners, will create a serious obstacle. Nor am I aware of any existing circumstances, in the Lower Province, which can be said to counterbalance these objections.

It is no doubt true, that many individual instances of prosperity are to be met with in Lower Canada, among agricultural settlers from Britain and Ireland ; but these must be viewed as exceptions, and not followed as a rule.

Even the land-measure will somewhat tend to embarrass a stranger, as it is the *arpent* (about one-fifth less than the English acre) which is in use, and the tenure and titles of his property will still more perplex him. I had an opportunity of seeing and conversing with several British emigrants, who either occupy or possess farms in Lower Canada, and the uniform conclusion, to which all of them came, was an advice to look at the Upper Province before I formed an opinion upon the eligibility of a settlement. I am quite aware that several of these individuals are prospering in a measure, which might possibly be curtailed, if too many farmers of a like stamp should become located beside them ; but I am equally satisfied that no such jealousy influenced

the advice I received, and that the established conviction of all, who are experimentally acquainted with Canada, is in favour of the Upper Province, as a settlement for British agriculturists.

Those emigrants who have obtained land near Quebec or Montreal, and who are industrious and active, profit, of course, very handsomely by the vicinity of these cities.

Dairy produce brings in excellent returns, and every thing finds a market; and although mere locality cannot avail so much as formerly, when steam-navigation was unknown, still great advantages remain to the occupier of land near large towns. It is to be remarked, too, that the greater supply of farm-produce, occasioned by the introduction of steam-boats, has materially increased the consumption, and has thereby compensated to the farmer the fall in price, which necessarily followed.—Fresh butter, which sold, in 1817, for 1s. 6d. per pound, in Montreal, may now be had for 6d. In summer it is a perishable article, and must be sold when it comes to market. But hay, straw, potatoes, &c. and the very soil itself, are becoming, in the vicinity of Montreal, what an Angus farmer termed to me, “*mischievously dear*,” and those who are in possession of farms in that vicinity will reap an abundant harvest.—My Angus friend, who seemed to be in the enjoyment of very easy circumstances, affords a proof, among hundreds, of what an industrious and steady man may do for himself in Canada. He came out in 1817, was wrecked in the Gulf of St Lawrence, suffered many hardships, and finally landed at Montreal, devoid of every resource, save his own hands and good spirits. He soon found employment, and in due time took a lease of a farm, which he finds to succeed extremely well. His wheat and potatoes, he says, are excellent; oats, inferior. He cultivates green crops, taking mangel wurzel instead of turnips, which suffer from the fly. He uses horses in preference to oxen; has iron-ploughs, and follows what he called a *sort* of rota-

tion,—1st, Wheat; 2d, Green crop; 3d, Clover; 4th, Timothy for hay; and, 5th, Pasture.

Several farms are at this time to let in this quarter. The rent expected is 10s. or 12s. per acre.

The Canadian farmers pursue the old Scottish practice of infield and outfield, taking crop after crop of grain from their fields, until nothing but weeds remain, and looking to Nature for that renovation which their own industry ought to have effected.

It may appear almost incredible, but I was assured of the fact, that it was by no means unusual, as winter occupation among the *habitans*, to drive out dung from their farmyards, and deposit it upon the glassy surface of the St Lawrence, there to await the breaking up in spring, as a riddance from what they consider a worthless incumbrance.

In tracing a route upwards from Montreal, the eye of an emigrant is speedily arrested by the junction of the Ottawa, or Grand River, falling into the St Lawrence. I did not visit the settlements of this district, and do not therefore speak of them from personal observation; but they are well known to be valuable, extensive, and increasing. The Ottawa has, of late years, attracted the notice of Government, as a safe route for troops and stores to the upper province, in the event of war with the United States. In surveying its banks, and applying its course to this purpose, extensive tracts of fine land have been located, and several very promising settlements have been established. Of these, I may notice Perth, Richmond, and Lanark, the two former chiefly composed of retired officers and reduced soldiers; the latter, of families from the manufacturing districts in the west of Scotland, who came out in 1820, and all, I believe, as communities, doing well. All of these were assisted and fostered by Government. A military road communicates between Ottawa and Kingston, upon Lake Ontario, a distance of 240

miles. The Rideaw Canal passes through a part of the country between this line of road and the St Lawrence.

The soil of this part of Canada is good ; but the country is flat, the lakes shallow, and the streams frequently sluggish, which must be necessarily accompanied, for a time, with fever and ague to a greater extent than more airy and better watered situations present. There can be no doubt, however, that the settlements already formed, and to be formed, in this quarter, will prosper. Government has done much for them by public works, which can scarce fail to benefit the country, whether they do or do not effect the objects for which they were planned ; and the steam communication upon the Ottawa with Montreal is already in operation.

Upper Canada is situated between 42° and 52° North Lat. and between 73° 30' West Long., and indeed indefinite bounds to the west.

Returning to the St Lawrence, we enter the Upper Province, the Uttawas here forming the boundary line. As we ascend the river, we find numerous settlers, and thousands of acres well adapted for the farmer. One of the first settlements we meet with is the Glengarry district, an extensive tract of good land, enjoying the advantages of water carriage. The language, the customs, the native courage of their Celtic sires, still distinguish the clan, though, at the same time, we are afraid, accompanied by some of those less profitable traits which stamp the Highlander as more at home in wielding the claymore, or extracting mountain-dew, than in guiding the ploughshare to slow but certain results. The farms are but indifferently improved, considering the advantages they have enjoyed ; and much valuable time is expended in the depths of the forest, in a demi-savage life, cutting and preparing timber for the lumber merchant, which, if steadily devoted to the cultivation of the land, would certainly be attended with infinitely greater benefit, both in a physical and moral point of view.

Very conflicting opinions exist in Canada regarding the lumber-trade, and the subject was frequently discussed at this period, from the late proposal of ministers to lower the duties upon Baltic timber. It is certain that a large circulation is occasioned by the trade, perhaps a million Sterling, in one way or another, and that it employs, during winter, many who may gain perhaps L. 20 for their winter labour when nothing else could be done. It benefits the farmer too, by bringing a market for produce to his door. So far, all looks well; but there is no doubt, that those engaged in preparing timber for this trade being exposed to many hardships, acquire loose and debauched habits, which generally demoralize; and that, in fact, no steady industrious characters are now willing to engage in it. In regard to the merchant, I have reason to believe that the lumber-trade is by no means profitable, and that many merchants are anxious to back out as soon as they can. There can be no doubt, in any case, that if the trade is to be extinguished, it must be done in a gradual manner, and that any alteration of duties which would suddenly annihilate it, must be followed by very painful and hazardous consequences to the colony.

To go minutely into the statistics of even the banks of the river, would far exceed the limits to which I must necessarily restrict myself. Suffice it to say, that a constant succession of eligible situations present themselves for estates and farms. I was much pleased with the Matilda district, and consider it capable of great improvement. The soil is a fine mellow sandy loam, sometimes perhaps rather light, but admirably adapted for turnip husbandry and fine woolled sheep, with numerous beautiful situations for a residence, the noble St Lawrence ever forming a prominent feature, its surface varied by lovely wooded islands, similar to those we so justly admire on many of our British lakes. In approaching Kingston, or the east end of Lake Ontario, the river Guanagogue falls into the St Lawrence, and, at its mouth, is the establishment of

Messrs M'Donell, two brothers who came about eight years ago to the colony, and who, by steady enterprise, without original capital, have realized considerable wealth, while, along with it, they have secured the respect and esteem of all who know them. They have here, what is called in America, a valuable *water privilege* or *fall*, and have erected flour and saw-mills to a large extent. Last season they sent down to Montreal 24,000 barrels of flour; and a friend of mine who was their agent, informed me that one of the brothers having resolved upon becoming their own agent in Montreal, it would be a loss of some hundreds a-year to his house in commission. They have a very clever cooperage worked by water, similar to the steam cooperage at Glasgow, and the articles turned out are uncommonly reasonable, substantial, and neat. I regretted much not having it in my power to form an acquaintance with these spirited colonists, more especially as they farm likewise to a large extent. The farm at Guana-nogue extends to 1200 acres, and the mansion-house and barns are commodious and handsome.

Having received very encouraging accounts at Kingston, of the country along the Bay of Quinty, a deep inlet of Lake Ontario, formed by a peninsula called Prince Edward's Island, I made an excursion into that district. The scenery was pleasing, in many places very fine; and settlements are forming on every hand. The soil is partly clay, partly loam and sand, sufficiently rich to yield fifteen crops of good wheat, with impunity, in a period of twenty years. Granite, limestone, and schistus, or clay-slate, are successively met with. Wherever a stream or creek of any importance falls into the lake, there we find a mill-seat and a village growing up, the embryo, in many cases, of considerable towns.

To the patriot or philanthropist, it is highly gratifying to remark, how the wants of the farmer and the interests of the trader or mechanic co-operate in the rapid progress of general improvement and civilization. Holywell, Sophiaburgh,

and Belleville are all thriving villages of this description ; and many individuals are to be met with in each, who, from the humble situation of merchants' clerks, &c. are rapidly acquiring independence. The last is the county town of Hastings, which has already three churches, a court-house, and projected jail ; a valuable mill-power, and fine situation for houses ; the high road from York to Kingston passes through it, and, altogether, it seems destined to become a place of some note. I was really astonished at the frequent calls which the steam-boat made for produce, and, ere we reached Kingston, our deck was absolutely heaped with flour-barrels.

I have said nothing hitherto of the price or value of land in Canada, and it is extremely difficult, in the settled parts of either province, to ascertain any thing like a fair average rate.

Prices are perpetually fluctuating, and must be regulated by the circumstances of the seller ; one man being willing to sell his farm for five dollars an acre, under a strong desire to commence anew upon a forest tract, or labouring under necessity, while his next neighbour may probably refuse to part with similar land for less than ten or twelve dollars per acre. Of this, however, there is no doubt, that very eligible and a vantageous purchases may, at all times, be made by a prudent capitalist, and that land is every year increasing in value, wherever it is desirable to possess it. Great bargains are sometimes obtained at public sales, by warrant of the sheriff, for payment of land-taxes. Land thus sold is subject, for a certain short period, to be redeemed by the individual, or his heirs, who originally obtained the grant ; but, as it seldom exceeds, at a sheriff-sale, 6d. or 7d. per acre, it is well worthy of a trial.

Steam navigation may be said to have been created for America, and it is difficult to estimate the advances which the States and the Canadas will soon make under its influence. To emigrants it not only affords a safe, cheap, and agreeable conveyance ; but, from the large concourse of passengers, a

fund of valuable local information may always be procured, and useful acquaintances formed; while it is impossible to overlook the silent but important effects, in clearing the forest, which the consumption of fuel on board the steam-boats is destined to accomplish. Perhaps it is not fanciful to assert, that the woods of America are now actually clearing by means of steam.

York, the capital of Upper Canada, and seat of government, is a very desirable station for a settler to choose as head-quarters, in looking about for a purchase. He is sure, at this place, to meet with numerous offers of farms, regarding which he will do well to act with caution; and he will be able to inspect the plans of public lands in the government land-office, under the superintendence of Mr P. Robinson, a gentleman able and willing to afford him every facility.

The *rich* and *heavy* land of Upper Canada is not to be found, in general, upon the immediate banks of the lakes and rivers. It lies, for the most part, from twelve to twenty miles back, and thus compensates the enterprizing settler for plunging into the forest. Government have still, I believe, about four millions and a half of acres to dispose of, besides seven or eight millions more, beyond the lines of what has been surveyed. No land is now granted to individuals without payment, the price varying according to situation and quality, and subject to the regulation of clearing and fencing five acres within two years, erecting a house 16 feet by 20, and also clearing half of the road in front.

Another land-office, highly interesting to emigrants, is likewise to be found in York. It is here that the commissioners of the Canada Company reside, and have their principal establishment. This company, as is well known, purchased from government $2\frac{1}{2}$ millions of acres in the Upper Province, with the view of disposing of it in lots to settlers, at an advanced price. The company is yet too much in its infancy to speculate upon results; but no reasonable doubt can be

entertained that it must operate favourably in procuring settlers.

A great progress has been made in the formation of roads, bridges, mills, &c., which government would not, and private individuals could not, have effected in the short period which has elapsed since the establishment of the company; and, although a feeling inimical to their measures shewed itself in some quarters, I confess myself unable to discover, for that jealousy, any reasonable cause. I had very full discussions with the commissioners and agents, from which, as well as from their published proposals, I feel satisfied that emigrants of every class may commit themselves to the Canada Company, in perfect assurance of experiencing the most kind, honourable, and liberal treatment. Circumstances dependent upon the state of a new country, may delay the execution of plans beyond the promised period, but there can be no doubt of the company fulfilling all their engagements as speedily as possible. The prices of land vary from 7s. 6d. to 15s. per acre. I was much impressed with a favourable opinion of the Great Huron Tract, from the fact that many steady Dutch settlers, in the possession of old productive farms near York, were, at the period of my visit, disposing of their property and removing to Goderich,—a change which the calculating Dutchman would not have rashly adopted, without pretty reasonable prospects of bettering himself to a considerable amount. “The township of Goderich contains about 400 inhabitants already, and several Dutch families from the neighbourhood of York, have sold, or are endeavouring to sell, their cultivated and valuable farms, and have purchased lands from the company in the Huron Tract. About 6000 acres have been sold them in the neighbourhood of Goderich within the last six months. In Guelph, a very valuable mill has lately been erected, and one in Goderich is now in progress.”

In a young and thinly-settled country such as Canada, every accession of an industrious family or individual tends

to the welfare of all; and it is therefore natural to suppose that such a corporation as the Canada Company would be fully awake to this principle. We find, accordingly, that in forming arrangements for forwarding emigrants to their own lands, they have offered very favourable proposals to emigrants at large. They state, that "all persons depositing L.20 with the Canada Company's agents in Quebec or Montreal, will be forwarded to the head of Lake Ontario by steamboats, free of expense, and have liberty to select land in any part of the province, at the current price charged by the company, when the whole amount of their deposit will be placed to their credit on account of their land. But, should they prefer purchasing from individuals and not the company, then the expense of their conveyance will be deducted from the amount deposited, and the balance paid over to them. Persons depositing a sum equal to their conveyance, with their families and luggage, from Quebec to the head of the lake, may avail themselves of the company's contracts with the forwarders; and should they, within three months after arrival, select land in Guelph, and pay one-fifth of the purchase-money, then the amount of their deposit in Quebec will also be placed to their credit, and they, their families, &c. be thus conveyed from Quebec free of expense."

It may perhaps be interesting to give a few agricultural notes of an excursion from York by the head of Lake Ontario, Toronto, Waterloo, Dumfries, Hamilton, &c.; but before leaving the capital, I must, with pleasure, add my humble testimony to the energy, good sense, and patriotism of Sir John Colborne, in his situation as Governor of Upper Canada. Of his well-known military talents, I am no judge; but of the soundness of his policy, in regard to emigration, allotment of public lands, encouragement of agriculture, and improvement of the general constitution of society in the province, I am enabled to speak with unqualified praise. The experiments

hitherto made by government have been, in Sir John's opinion, defective in system and concentration.

Had the establishments of government emigrants been kept more together, this very circumstance would have greatly tended to general advancement. At present they form only a few *oases* in the desert, and a long period must necessarily elapse, ere the intervals are even in some degree filled up.

In conversing with Sir John, I ventured to suggest that something was required on the part of government, in making preparation for the thousands of emigrants who are pouring into Canada every season, and who suffer heavy losses, both in time and means, from the want of some previous arrangement. It seemed to me that the agent for emigrants ought to be a gentleman not engaged in trade, but one of active habits, acquainted with rural affairs, and with the agricultural classes, who might be ready at all times to point out land or labour to emigrants, according to their ability and means. Without going into minute details, Sir John assured me that he felt the want of such an arrangement much, and that a great deal of good might be effected by it, and a great deal of government land sold, and that he had represented the matter to the colonial office at home.

Emigrants unable or unwilling to purchase, will have little difficulty in providing themselves with a farm to rent, either for money or on shares, which means half the clear produce as rent. I was told by a gentleman of a friend of his, who was very comfortably settled in this way near York, upon a farm of 200 acres. Eighty acres are cleared, the remainder in wood pasture. He pays only L.25 of rent, and clears L.200 per annum, besides keeping his family.

To show how land is advancing in value, this farm, a few years ago, might have been purchased for L.200, but is, of course, worth a great deal more now. Market gardening, and rearing good live stock, are two branches that will pay well in this quarter.

I left York, on Wednesday May 11th, in the stage, for Hamilton, at the head of Burlington Bay, it being my intention to stop at night, and diverge next day into the woods. The roads were yet unrepaired for the season, and we travelled in an open waggon, the day fine, and for the first time somewhat sultry. It was interesting to observe the sudden transition from the streets of York to the solemn stillness of the forest, as, I think, we could not have proceeded above two or three miles, ere we were immersed in all the wild magnificence of a cedar swamp, and hemmed in by towering pines and hemlocks on every side. A cedar swamp forms an exception to a general rule, as it enjoys pure water, and secures health to its inhabitants, which is also the case where the hemlock, fir, and spruce, abound. The land, in such situations, is not of the richest quality, sometimes sandy and poor, and the absence of fever and ague would seem to be granted in compensation for diminished returns.

Our route lay through Toronto district, and I had the gratification of observing cultivation in every stage of its progress. There was the rude *shanty* or log-hut, its owner wielding the axe against the stately vegetable columns around him, or employed in reducing them to ashes, while some were left standing to blacken with the flames, or doomed to a protracted fate under the operation of *girdling*, by which the bark is cut round the stem, and life destroyed. A little farther on we pass an older farm. The mansion and offices commodious and neat, rich orchards loaded with blossom, fine wheat and pasture or meadow land, healthy looking children at every door, with pigs and poultry in abundance. As we passed each farmer's open door, we saw groups of old and young seated at their evening meal, neat, clean, and comfortably clad. In general, Canadians and Americans are deficient in what we call *dressing up their doors*; they are, in fact, so much engaged in heavier and more important work, that the period for training roses and honeysuckles has not

yet arrived. We passed, however, one small property this evening, belonging to a Mr Adams, and laid out as a nursery, (smile not at a nursery in America), filled with peach, apple, and pear trees, flowering shrubs, &c., and which, by its neat arrangement and excellent order, forms at once a contrast and an example to its neighbours. We encountered some very steep hills and some hazardous road, especially ascending and descending the banks of two considerable creeks or rivers falling into Ontario. Large sums have been expended in levelling, &c. apparently with but indifferent judgment or success. I reached Summer's tavern, 35 miles from York, about eight, and found a most obliging host, with comfortable accommodation.

It being my intention next day to visit the city of Guelph, founded by Mr Galt, when he acted as commissioner for the Canada Company, my first inquiry was for saddle-horses and a guide. These were procured by my landlord, and at seven next morning I started, the distance to Guelph being called twenty-six miles. I shall not in this place detail the perils of the way, the horrors of *rotten corduroy roads*, *cedar swamps*, *windfalls*, &c., with the additional comforts of a misty rain, two roads diverging in a remote part of the forest, and the satisfaction of finding, upon an appeal to my guide, that he had never happened to be at Guelph before; suffice it, that I reached my destination about three o'clock, after a most floundering journey. The road is through the finest forest scenery I had yet seen, and clearings were going forward in various places, and in every state of progress. I could not but admire the luxuriance and healthy appearance of the wheat and clover. The whole tract is upon limestone, and, in some places, the road passes over ridges of it absolutely inexhaustible. The cattle and pigs are but very indifferent. The state of the road may be, in some measure, estimated from a party which I passed, consisting of three men and six oxen, that had been three days absent from home, which they would

only reach that day, drawing a load under which a donkey would have trotted upon any British turnpike, and the whole extent of the journey not exceeding twenty miles. Guelph is situated in the Gore district, about eighty miles from York, and has been laid out upon an extensive scale. A fine stream flows past the town, and a large grist mill is at work upon it. A good deal of land has been located in the neighbourhood, and the town may ultimately prosper. At present it wears a stagnant appearance, and conveys somewhat the idea of the *cart preceding the horse*. When farms become numerous, and a mill is erected in a convenient situation, a town soon grows up; but here the town has been hurried forward, in the hope of settling the land. A vast deal of capital has been expended upon roads, &c., which must have so far benefited labourers, and tended, in some measure, to enable them to purchase lots; but, at present, a very desolate complexion marks Guelph, as a city which may be very thankful to maintain its ground and escape desertion. The price of company land is here about 15s. per acre, of good quality; and, I believe, from the unsteady character of some of the early settlers, good purchases of farms partially cleared are frequently to be had. Guelph stands upon a fine natural platform, with the river flowing round it. A good bridge was nearly finished when I was there, and an extensive line of road is intended to connect this with the Huron settlement at Goderich.

I spent the evening in company with Mr Prior, the acting manager, who has many arduous duties to perform. We conversed, of course, much upon the subject of emigration. His opinion coincides with the general conviction, that no steady industrious man can fail to prosper in Canada, according to his means. The Commissioners are now greatly more circumspect in the character of settlers than was the case at first; and it is a leading object to obtain sober, moral, correct men, that a good neighbourhood may be every where secured.

This must, of course, impose a painful and difficult task upon the agents, requiring much firmness and discretion.

Mr Prior told me, that, during a temporary absence, a party of a bad stamp had located themselves at Goderich. Having satisfied himself of their character, he sent for a vessel, and almost *vi et armis* shipped off fourteen families at one sweep

In disposing of lots to settlers, two methods are adopted in Canada, and their respective advantages and disadvantages are warmly discussed. The one adopted by the Canada Company is to *insist* upon an instalment at entry. The other method is to leave payment of any portion optional to the settler, but carrying on an account of interest against him. The advocates of the first plan maintain, that, by paying down a certain sum at first, the settler feels an interest and a degree of independence which he would not otherwise experience, and that the sums advanced enable the landlord to make roads, erect bridges, mills, &c. ; and further, that, as the black account is always running on, and a day of settling must arrive, for which the settlers are too often forgetful to provide, it ends in the abandonment of the farm, and in ruin to themselves and families. For the second plan, it is argued, that many industrious worthy men have absolutely no capital to begin with, beyond what may be necessary to purchase oxen, ploughs, &c., and to maintain their families, until a crop is gathered, and that to exact their pittance in such circumstances, is, in fact, to stifle their industry in its birth. By allowing time, and regularly balancing the account, taking occasionally what may be forthcoming either in cash, cattle, or grain, a poor man slips into clear possession without feeling any inconvenience. We shall find that, as in most questions of the kind, there is much to be said on both sides, and probably either plan may be followed with advantage in certain particular cases. The United States, who bestow much attention on the disposal of their public lands, have resolved, in the wes-

tern country, to exact, not an instalment only, but payment *in full* at the entry of settlers, though it is to be observed, that a man may there acquire 80 acres for 100 dollars, or L.22, 10s.

Friday 14th, Mr Oliver, my landlord at Guelph, having agreed to drive me in his waggon to Mr Dickson's at Galt, a gentleman who purchased from Government a whole township, and to whom I had particular introductions, we started about 11 o'clock, and reached our destination about 4. The road was certainly superior to what I had travelled yesterday, though mud holes and rotten *corduroy* were occasionally to be met with. Limestone was to be seen on every hand in great abundance, and I observed, at one place, a kiln hewn out and erected in the very stratum itself. Wherever a clearing occurred, the wheat looked beautiful. We passed through the township of Waterloo, settled mostly by Dutch. The soil appeared to be a good, useful, sandy loam, well watered by streams and springs. I was delighted with the cultivation, especially upon the farms of Schneider and Warner. Each farm might be from 200 to 300 acres, laid out into regular fields, and *not a stump to be seen*. The ploughing was capital, the crops most luxuriant, and the cattle, horses, &c. of a superior stamp, with handsome houses, barns, &c., and orchards promising a rich return. Waterloo satisfied me above all that I had yet seen of the capability of Canada to become a fruitful and fine country.

The forest around consists of heavy timber, and the township does not enjoy the advantage of direct water-carriage; yet have these Dutchmen, within a period of twenty years, produced farms, which in general aspect very nearly resemble well cultivated land in Britain. The farmers are primitive and simple-minded, attending to little beyond their own affairs, and so indifferent in regard to politics, that Mr Dickson doubted much if some of them were yet aware of the death of George III. A great deal of capital flowed into

this settlement, during the large expenditure at Guelph by the Canada Company, the Dutchmen supplying teams, provisions, &c. My travelling companion valued some of the farms at 25 dollars, about L. 6, per acre.

Chopping or clearing land, ready for sowing, will cost sometimes 12 dollars, or L. 3 per acre; the first return will be 15 or 20 bushels of wheat, worth at present 5s. per bushel. The usual mode of clearing timbered land is to cut down and burn all the wood of one foot diameter and under that. The larger trees are only girdled. Clearing, in this way, costs about 8 dollars, or 40s. per acre. When this is done, a crop of wheat can be harrowed in, to be followed by two or three years of pasture or hay, when the plough may be used, and, during which time, the girdled trees are either cut into fencing stuff or burnt. No lime has been used as yet upon this land, and I was told of two instances, where farmers had absolutely built new stables and barns, to escape from an accumulation of despised manure.

A few miles before reaching Galt, the residence of Mr Dickson, we came in view of a fine stream, bearing the name of Grand River, but, of course, quite unconnected with the Uttawas of the lower part of the province.

The settlement of Mr Dickson is one of much interest, being conducted by himself, on his own resources, in the same way as that of Colonel Talbot on the banks of Lake Erie. Mr Dickson began operations in 1815-16, by the purchase from Government of this township, extending to 96,000 acres, and to which he gave the name of Dumfries. He selected a convenient spot with good water-power, to commence a town, and formed a connection with an enterprising American, who speedily established very extensive mills. Mr Dickson built a commodious residence for himself, in a romantic situation, overhanging the river, and communicating by a bridge with the mills and town. His plan of dealing with settlers is extremely liberal, as he does not insist upon any instalment

being paid down ; and even, in some cases, advances the means of purchasing oxen, &c. In this way, the poorest emigrant, if steady and industrious, must get forward.

A regular account is opened with each individual, and partial payments, either in money or produce, accepted by Mr Dickson, from time to time. The price of land is 4 dollars or 20s. per acre. Farms have been occasionally abandoned by unsteady or impatient individuals ; but some progress in clearing has always been made, and, of course, the farm has, in so far, been rendered more valuable. A very considerable extent of land has been disposed of, upon both sides of the river, and hundreds of acres of fine wheat are to be seen contiguous to each other.

An attempt had been made last spring to convey produce down the river to the Welland Canal, by which Mr Shade, the owner of the mills, informed me, a saving of two-thirds would be effected upon the transports of flour. This voyage was performed by a son of Mr Dickson, accompanied by Mr Shade, and being a navigation of about 100 miles, attended with some hazards, as a first attempt, it created a good deal of sensation at the time of my visit, and much satisfaction among the farmers by its success. Mr Dickson has about 2500 souls upon his estate, and draws a very handsome income from the interest of sales. I visited the mills with Mr Shade, who took much trouble in explaining to me the various machinery. The establishment comprises flour-mills, saw-mills, cooperage, &c., and appeared to me equally extensive and well arranged. I have been every where struck with the havoc and destruction of the woods, and had a remarkable opportunity at this place, of contrasting the value of a tree in Upper Canada with what it would have fetched at home. An uncommonly large and beautiful pine was lying at the mill, which I could not estimate at less than *L. 3* in Britain. Mr Shade, upon my putting the question, told me it just cost him a *York shilling*, or *sevenpence Sterling*.

Saturday, 15th May.—Mr William Dickson having kindly insisted upon conveying and accompanying me to Hamilton, where I was to resume the stage, we started, on horseback, after breakfast, and visited various farms upon the township. The road lay along the river, with much fine wood and beautiful scenery. The crops were looking healthy and well coloured. Some farms, partly improved and fenced, with houses, were on sale,—the price demanded was 8 dollars, or 40s. per acre. There seemed to be abundance of water every where, both from springs and brooks falling into the Grand River, and the substratum was still limestone. Some miles below Galt, there is a valuable gypsum quarry on the banks of the river, and it was curious to observe the line of rich and verdant turf, which marked the route of the waggons in their visits to the quarry, from scattering as they went along, strongly evincing the effect as a top-dressing. We called upon a settler from Scotland, newly entered upon a farm of 100 acres, for which he had paid down L. 100. The soil was a good rich sandy loam, worth in Britain 35s. per acre at least of rent.

The forest is here thin, probably not having more than forty or fifty old oaks upon an acre, and not requiring these to be destroyed, it being quite possible to guide the plough through the intervals.

Walter Smith was busy with his pair of oxen, preparing the land for wheat, of which he expected to have thirty acres sown in autumn, the return from which will probably repay him the price of his farm, and allow him L. 50 or L. 60 besides for his labour and maintenance, *from the first crop alone.*

There are some delightful situations in this quarter for mansions: the river upon one side, and a lovely sheet of water, called the Blue Lake, upon the other; fine open woods, springs, brooks, and a dry healthy soil. It was a favourite haunt in old times of the Indians, and a little mound close by a

copious spring, is still celebrated as a place where great councils were held. We stopped to rest our horses, at a new village called Paris, belonging to a very active individual of the name of Capron, and having a good water-power and other advantages, it promises to become, ere long, a place of some importance. In the afternoon we reached Brandtford, a pretty considerable village belonging to the Indians, a tract of land in this quarter having been reserved for their behoof. It is managed by Government, who account for rent and sales to the chiefs. There had been a sale of village lots this day, and for the first time I saw the Indians assembled in any number. The lots sold for L. 25 one-fourth of an acre, which is an immense price in Canada, and argues an expectation of Brandtford continuing to prosper. Many of the Indians are now beginning to acquire settled habits, and to cultivate farms, but many more are yet totally abandoned to idleness and debauchery.

The country to Hamilton by Ancaster, is partly forest, partly settled. The soil is chiefly clay. Ancaster stands high, with some fine farms about it, healthy and well watered.

Immediately before reaching Hamilton, we come to the brink of a high limestone ridge, and command a magnificent view of the rich flat below, extending to Lake Ontario. At St Catharine's, a small town dependent upon the Welland Canal, we passed that work, and saw some of the wooden locks.

The country through which I travelled next day lies between the great limestone ridge and Lake Ontario. This remarkable ridge extends from the Genessee country, in the State of New-York, and, crossing the Niagara River, forms the celebrated falls. It is beautifully diversified with woodland, orchards, and farms, is very productive, and settling with considerable rapidity. On Monday evening I concluded this part of my excursion, by reaching a friend's house at the falls.

Before proceeding to the third branch of my letter, viz. Emigration to the United States, I may notice the current average prices of some articles in Upper Canada, at this date, May 1831 :—

Ploughs from	L. 1 10 0	to	L. 2 0 0	Currency.
Waggons	15 0 0			
Farm horses, five years old,	12 10 0	to	15 0 0	
Oxen for draught	10 0 0	to	12 10 0	per pair.
Cows	2 0 0	to	3 0 0	
Sheep	0 5 0	to	0 7 6	
Swine	0 10 0	to	0 15 0	per cwt.
Poultry	0 0 7½			
Farm servants per annum	24 0 0	to	30 0 0	and board.
Female ditto. do.	12 10 0	to	15 0 0	

May 1st 1831—Prices of Farm Produce.

Wheat per bushel of 60 lb.	. . . . .	L. 0 5 0
Barley do. of 56 lb.	. . . . .	0 3 1½
Oats do. of 36 lb.	. . . . .	0 1 0
Hay per ton	. . . . .	1 5 0
Corn (Maize) per bushel of 60 lb.	. . . . .	0 2 6
Potatoes do. do.	. . . . .	from 1s. 3d. to 1s. 10d.
Pork per lb.	. . . . .	0 0 3½
Butter ditto	. . . . .	0 0 7½

Labourers were receiving last spring about 8 dollars or 40 shillings per month, and board, at the canals and public works.

This fine province is making wonderful advances, and when the canals and some projected railways are fairly in operation, its progress will become yet more rapid. In 1824, 10,000 bushels of wheat were shipped upon Ontario from Burlington Bay, and in 1830 the export had reached to 150,000 bushels. Five bushels of wheat are allowed to the barrel of flour.

The two great Canada canals have given rise to much public and private discussion ; and opinions of their value, diametrically opposed to each other, are entertained by men who would seem equally qualified to judge.

The Welland canal, which connects Lake Erie and Lake Ontario, avoiding the Niagara Falls, is intended for mercantile purposes. The Prideau Canal has been executed by government with a view both to mercantile and military purposes. Without at all presuming to give an opinion, I feel bound to state, that the impression made upon my mind, by those persons whom I considered perfect masters of the whole bearings of the case, and whom I know to be independent and disinterested men, is adverse to the utility and probable success of these great works. Heavy as the expense, however, has been, we must not rashly infer, that it has been altogether thrown away ; and, although it is possible that a far more moderate expenditure upon roads and railways might have been attended with happier results, we must yet hope to see essential and important benefits flowing from these canals

III.—*United States.*

In offering a few remarks upon the prospects of emigrants to the States, so many circumstances occur upon which it would be necessary to touch, that I almost shrink from the attempt. The great and interesting tie which must be severed when we leave our native country, and become the denizens of another, is a point which every man must settle for himself. Should it prove no impediment, he will find numerous and varied fields of agricultural enterprize presenting themselves in every quarter of the Union. He will find perfect security and independence, and, with ordinary good sense and good humour, can have no difficulty in maintaining friendly habits with his neighbours.

Two plans present themselves to the emigrant with capital in fixing his residence in the States. He may either purchase or occupy a farm in the old settled part of the country, or he may establish himself in some of the new or yet unsettled portions of the older States. The choice must be dependent on

the means and character of the individual ; but in either way the greatest risk of disappointment will always be found in fixing too hastily. I would strongly recommend to every man who may emigrate to Canada or the States, that he should allot some months to looking about him, ere he make a purchase, which it is not again so easy to exchange, should any of those numerous drawbacks present themselves, which we are ever too apt to overlook in the excitement of the moment.

The arrangements for managing and disposing of the United States' public lands are very complete, and no difficulty or annoyance is likely to occur, if we except, perhaps, the delay in receiving the *formal* title or patent, occasioned by a heavy arrear of business in that department. This occasions, however, neither loss nor hazard, as the warrant of possession which every purchaser immediately receives, secures him in all the rights of property.

A bureau at Washington, under a head commissioner (at present Judge Hayward), superintends the various land-offices established throughout every part of the country, and where intending purchasers are treated with the utmost civility and dispatch.

I had the honour of being personally introduced to Mr Hayward by the President himself, and I would take this opportunity of expressing my deep sense of the cordial and kind reception I met with from General Jackson, Mr Van Buren, and others, and of the candid and open manner in which the business of the land-office was explained to me by Mr Hayward.

As it is impossible, within reasonable terms, to discuss *seriatim* the respective fitness of the different States for affording comfortable settlements to British emigrants, I shall detail my own personal observations, made upon the Banks of the Hudson, above Albany, and in some parts of the Genessee country, and the information which I was enabled to collect, from most respectable settlers in Michigan, as a fair

sample of what is generally to be expected in the western country, leaving such inferences to be drawn as the statements deserve.

Various classes of settlers are to be found in the States, from the man of substance and capital to the rough back woodsman and *squatter*; but a minute discussion of the several grades does not seem to be here required.

The first farm which I visited was in the immediate vicinity of Albany, forming part of the princely estate of Mr Van Ransalær. It contained 600 acres of fine mellow loam along the banks of the river, divided into fields by rail-fences, which cost here 4s. 6d. per sixteen feet, including boards, nails, and work,—four rails, and about five feet high.

The crops chiefly raised are wheat, Indian corn, with pumpkins, planted in the intervals or rows, oats, potatoes, and large quantities of Timothy for hay. The buildings are of timber, handsome and convenient.

The farm was let, some years ago, at 2000 dollars, or L. 450, which, in America, seems to be a very high rent; but it must be recollected that the situation is particularly favourable, from its close contact with the thriving city of Albany. A turnpike road upon Macadam's principle, has commenced, from Albany to the north, and six miles of it are already completed, at an expense of L. 2000. It runs through the centre of this farm. It is, at present, the home farm of the eldest son of Mr Van Ransalær, who has imported, at considerable expense, from England, some fine short horn stock, and which he is very successfully crossing, with a judicious selection of native cows.

Although very fine cattle and sheep are to be found in some districts, I am satisfied that more may be done in the department of live-stock, than in any other branch of American husbandry.

As the country becomes more populous, manufactures (already far advanced), will continue to increase, and fat stock,

with dairy produce, must become objects of greater importance to the farmer than they have hitherto been. I met with a very intelligent cattle-dealer in Pennsylvania, who gave me much information on this subject. He and his partners deal, to a large extent, for the Philadelphia and New York markets. The system appeared to be perfectly organized. They purchase all the fat stock they can procure within a reasonable range of these cities, which are first disposed of to the butchers; and having thus cleared the field, they bring forward their droves from the *back settlements* or distant states, in such a succession, as supplies, without glutting the market. Some of their cattle travel above 600 miles, and are two months on the road. He told me that he purchased 400 oxen every year from one Kentucky farmer, and he considers a stock farm to be a very sure and profitable concern. New York takes about 700 oxen a-week, when the demand is brisk. These weigh on an average, about 55 stone, 14 lb. to a stone; and the price he receives, is from L.12 to L.13 a-head. I was happy to find his opinion regarding live and dead weight to coincide nearly with my own. When *prime fat*, he reckons on a sink of *one-third* only, on the live weight. He dislikes pumpkin fed beef, and always insists on the animals which he purchases being fed, at least latterly, on maize. His expenses are high, much of his stock costing him above L.2 a-head in road expenses; and he gives his head drivers 4s. 6d. a-day, with food for themselves and horses. His profits this season, he says, have been very handsome, and the trade in general is a good one to a steady man, with sufficient capital. Town manure costs about 3d. a waggon load.

Horses, in all parts of the States and Canada, which I visited, and I believe universally, are to be remarked as superior in the qualities of action, strength, and figure. It is rare to pass a farmer's team, without noticing horses worthy of being transferred to any gentleman's stud. They are kindly treated, well fed, and remarkably docile, of which I

met with repeated instances, which would have not a little astonished our first rate English coachmen. They are in general about 15 hands, or $15\frac{1}{2}$, and cost from L. 10 to L. 25 each.

From Albany, I proceeded about 30 miles up the river, where I spent several days with a friend, and, in his company, examined some farms, then on sale, in his neighbourhood.

To afford some idea of the expected prices and returns of old farms in this district, I shall subjoin a few notes, which I made, at the time of my visit.

1st, Captain Davenport's farm on the east bank of the Hudson. It contains 350 acres, 100 of which are in wood, hemlock, or Canada pine (the bark of which is in general use for tanning), maple, beech, &c. The soil is partly clay, partly sandy loam. A large portion is a rich holm, on the river side, and of the finest quality. The price demanded is 30 dollars, L. 7, 10s. per acre; but it would probably be bought for 25 dollars, or L. 5, 12s. The return might reasonably be expected to reach L. 112, 10s., clear of expenses, from the flat land, and L. 70 from the profit on a sheep stock, on the upper portion of the farm, in whole L. 182, 10s. The price would be at L. 5, 10s., L. 1875, and an outlay on buildings, fences, and drains, of L. 1000 more, would still be within L. 3000, for which you have a return of above L. 180. In making this rough estimate, I resolved to be moderate in estimating returns, and liberal in calculating outlay, and am perfectly satisfied that an industrious Scotch farmer would easily realize a profit of L. 200 a-year.

It is to be noticed also, that one-half of the timber might be at once sold off, without any detriment to the farm, and that I calculate upon the owner and his family drawing the ordinary articles of subsistence from the land, besides the above return.

2d, Next to this farm, was that of Mr Knickerbocker, con-

taining 275 acres. There is a fine holm also on this farm, and the upland seemed fully better than No 1. This farm was let last year in shares for one year, and the owner received L. 63. The price asked is L. 4 per acre, or L. 1100, and L. 200 more would be required for houses, fences, &c. There is no more timber than is requisite for the use of the estate. This farm seemed to be in very indifferent order.

3d, Mr Chesney's farm, 106 acres, with wood sufficient for use of the property. About 40 acres of very fine holm, capable of yielding, I was assured, 40 or 45 bushels of oats, or other grain in proportion. This farm could be had for L. 530, and would certainly return L. 45 or L. 50 clear. It was in very fair order.

4th, Mr Vely's farm, 118 acres, 40 acres of most superior holm; the upland good; with a stream running through it. The houses appeared to be new. This farm could be had for L. 400, and the return could not be less than L. 35 or L. 40.

5th, A farm of 300 acres, occupied by Colonel Grant, at a rent of 300 dollars, L. 67. 10s. The soil is good loam, nine parts of it are clay. A new dwelling-house, and a good barn, with a valuable wood lot. It might be bought for L. 1500.

The whole of these properties were evidently susceptible of great improvement, though in foul and bad condition. The local situation was good; the Champlain Canal passing within half a mile, but separated by the river. The roads are either already turnpike, or becoming such, though certainly not of a description to pass through the ordeal of Mr Macadam. No. 3 and 4 are contiguous, and might be advantageously thrown into one estate.

The following list of prices, &c. I procured from the best authority as current in April 1831:

Current Prices, and Rates of Wages, on Hudson River, above Albany, April 1831.

Wages.—Men for general farm-work, summer, L. 2, 5s. per month; winter, L. 1, 7s. per month. *Harvest-work*, cradling wheat, 4s. 6d. per day. A cradle-scythe is said to cut four acres a-day, and requires one man to bind to each cradler. Hay cutting, 2s. 7d. a-day.—Board found besides to all these. Good cooks, 18s. to 27s. per month. Chamber-maids, 13s. 6d. to 18s. per month.

Live Stock.—Good ordinary horses, L. 20 to L. 25. Oxen, per pair, with yoke and chain, L. 20 to L. 30. Cows, L. 4, 10s. to L. 6. Merino sheep, 9s. to 18s.; Saxony, 13s. 6d. to 45s.; common sheep, a sort of coarse Leicesters, 4s. 6d. to 9s. after shearing. Brood sow, L. 2, 5s. to L. 3, 10s. Hogs, 1d. to 1½d. per lb on live weight. Geese, 2s. 10d. a pair. Turkeys, 2s. 1d. each. Fowls, 6½d.

Utensils.—Farm waggon, L. 13, 10s. Ox cart, L. 10. Lumber sleigh, L. 3 to L. 5. Ploughs, 30s. to 36s. Pleasure sleigh, L. 7 to L. 70; ditto waggon, L. 9 to L. 35. Good double harness, L. 18.

Produce.—Wheat, 6s. 9d. per bushel. Barley, 2s. 8d. do. Oats, 1s. 6d. do. Indian corn, 2s. 3d. do. Potatoes, 1s. 3d. do. Beef, per quarter, 18s. to 23s.; per lb 2d. to 4d. Mutton, 1½d. to 2d. per lb. Veal, do. Pork, 22s. to 27s. per cwt. Hay, from 23s. to L. 3, 10s. per ton. Cyder, 4s. 6d. to 18s. per barrel, 32s. gallon. Wool, merino, 2s. 7d.; common, 1s. 8d. per lb (16 oz. to lb). Live goose feathers, 2s. 1d. per lb. Butter, 5d. per lb. Cheese, 2d. to 4d. per lb. Eggs, 4d. to 5d. per doz. Brandy (French), 4s. 6d. per gallon. Gin, 3s. do. Whisky, 1s. 1d. to 1s. 6d. do. Excellent table beer, 4s. 6d. per barrel of 32 gallons. Fire-wood, 13s. 6d. country

price; 22s. to 27s. town price, per cord of 128 cubic feet, delivered 4 feet long, and costs 2s. per cord to cut to length required for use.

The American farmers live comfortably, and at a very moderate expense. Candles and soap are generally manufactured from kitchen refuse. A good housewife assured me, that the butcher-meat for her family, fifteen in number, did not exceed *in whole* 1s. per day (three meals), except when she allowed them turkeys and other poultry, when she reckoned the expense at 2s. 6d. The flour consumed did not exceed 4s. 6d. per week. They have fruit, both fresh and preserved, in the utmost profusion; and the cyder barrel is always ready broached. A good many articles of clothing are spun, or woven at home; and the geese are subjected to periodical contributions towards the bedding of the household, or the feathers sold at a good price.

At a later period in my tour, I passed through a considerable portion of the Genessee country, celebrated for its great fertility, and the superior quality of its produce. Upon entering this part of New York state from Canada, I was immediately struck by the superior quality of the cattle. On many farms, I observed a variety of these in shape and size greatly resembling the heavy class of our west Highlanders. They were chiefly of a dark brindled colour, and many of them really handsome. I did not see one portion of the Genessee district, which is said to be uncommonly rich; but what came under my view, in a journey of between three and four hundred miles, in this part of the country, was certainly very fine. The surface is finely undulated,—rivers, brooks, lakes, farms, villages, and forest scenery all presenting themselves in succession. The soil is sometimes rather light, but generally a good, and often a rich black loam.

The crops of wheat, clover, rye, pease, and Indian corn all looked well; and the orchards of peach, plum, apple, &c. were richly laden with blossom. The houses and buildings

I found generally very good. Where land is let for a money rent, it is commonly 4s. 6d. per acre. Old farms sell from L. 4, 10s. to L. 9 per acre, including houses, orchards, &c.

I found every where in this quarter noble single trees, elm, oak, &c. judiciously left in the fields, affording both ornament and shelter, and the total absence of which, in many cultivated portions of Canada and the States, gives an appearance of nakedness even in situations where wood is treated as a nuisance. I would remark, also, that a great improvement, in shelter and beauty, would be effected, by frequently substituting hedges for rail-fences. An English farmer near Geneva, I was informed, has miles of fine hawthorn hedges, four feet high, and completely belying the assertion that thorns will not succeed in America. His practice is to plant in a *trench*, not upon a ridge or bank, as the great risk of failure is from the summer drought.

Before reaching Albany, I travelled the greatest part of one day through the valley of the Mohawk, and upon which lie the rich German flats. It is a noble country, and the land of the first quality, but farmed too often in a slovenly manner.

The country of Michigan, which I have selected as a sample of new settlement in the west, is at present quite *the rage*, and has, in a great degree, supplanted Ohio, Illinois, &c. It lies between 41° 31' and 45° 40' N. Lat., and 5° 12' and 10° West Long., to the westward of Lake Erie, and including an immense extent of country capable of improvement, with fine water privileges. Detroit, an old French town, is its capital. By a reference to the map, it will be seen that Michigan can readily avail itself of New York, New Orleans, or Montreal, as markets, and must, of course, derive from such facilities of intercourse considerable advantage. The climate is temperate and healthy. Winter sets in generally about the middle of November, and continues till about the middle of March. At Detroit, in 1818, the mean heat

of January was 24°; and in 1820, the mean heat of July was 69°; of December 27°.

The soil is in general a good fertile loam, upon limestone; and, in some places, a calcareous earth is turned up, mixed with the common soil, which is extremely productive. Clay is also prevalent in some parts.

This territory is better watered than any other in the United States. There is an abundance of game, deer, bears, hares, ducks, turkey, quail, &c. and it is finely diversified with lakes and brooks, rising in most parts from copious springs.

Besides other sources of information, I happened to travel, at different times, with two Michigan settlers, who said much in its praise, and, although it is quite usual for that class of persons to magnify the advantages of a country where they are themselves fixed, I have every reason to believe that the statements, separate and distinct, which I received from these individuals, were substantially correct, having found them, in all essential points, not only to confirm each other, but also to be corroborated by other documents and evidence, which it was impossible to doubt.

The first of these individuals whom I met, was a fellow-passenger in the track-boat from Buffalo to Rochester, upon the great Erie canal. He appeared to be one of those characters so numerous in the States, who are always ready to make a move when they consider it likely to better their condition, or even to offer reasonable hopes of a fair return, for indulging their love of enterprize. He and a brother had, in this way, explored Michigan a few years ago, and had picked up various lots of land, near intended towns, harbours, &c. for which they paid 5s. 7½d. per acre, and which can already be sold for 22s. 6d. per acre. They intend to dispose of some, and to occupy part themselves, as he likes the country for a residence. He considers it superior to Ohio, as being more healthy. The country is in some places under

heavy timber, and in others it is open prairie, where a settler has nothing to do but to start his plough. The soil is in general a loamy blackish sand, very productive. Eighty acres may be purchased in the Government Land-office for L. 22, 10s. A Mr Gilbert, who realized a fortune as a contractor for work on the Erie canal, has transferred his capital to and fixed his residence in Michigan. He vested L. 2250 in land, which, at 5s. 7½d. per acre, makes a tolerably extensive domain. He is farming and improving with great spirit, and this autumn he will have 400 acres in wheat. As a proof of the admixture of calcareous matter in much of the soil, Mr Gilbert had a tract of what he considered to be very sterile sand, and not worth 3s. an acre to sell. His men having been sent to procure some of this sand, to be employed in building, they found their hands *blistered*; and, upon a farther investigation, the calcareous matter in the sand has proved so useful, that Mr Gilbert would not take 25s. an acre now for what he had previously esteemed of so little value. Wheat is selling readily at Detroit for 4s. 6d. per bushel; the return is from 20 to 40 bushels per acre.

My other Michigan friend is established in the town of Upsilante, a city which does not yet figure in any map. He holds land and farms, but his proper avocation is somewhat miscellaneous. He has built a large tavern, opened a warehouse or store, and runs the stage for sixty miles. He appeared to be an uncommonly shrewd sensible man, looking sharp after every thing. When we met, he was travelling to New York, to make purchases of goods for the season, and, *inter alia*, two or three additional coaches. The influx of emigrants at present to Michigan is quite remarkable. Seven steam-vessels ply from Buffaloe to Detroit, and the decks have been swarming every day since the navigation opened for the season. Mr Stackhouse is convinced, that, for many years, a home-market will be found among the new settlers for all the Michigan produce.

Land-offices are established in various situations, where the settler may provide himself with a farm at the usual rate of 5s. 7½d. per acre. Should he chance to fancy one in some favoured spot (most of which are already secured along the great road for 300 miles through the country), he will have little difficulty in procuring it for 12s. or 15s. an acre.

Michigan is not yet admitted into the Union as a state. Intelligent settlers consider this to be no disadvantage. The expense of their public works, as roads, bridges, jails, court-houses, &c., are defrayed by the General Government, in place of being assessed upon themselves, and although they cannot boast of one or two members of Congress, their interests are sufficiently watched by a Delegate who resides at Washington, for that purpose. Mr Stackhouse describes the scenery as in many places, highly romantic.—The timber consists of black walnut, elm, beech, oak, hickory, sugar maple, &c. The produce of the land runs from 25 to 50 bushels after one bushel sown of wheat, Indian corn, &c. Turnips are likely to succeed well, also beet and mangel wurzel. Prices of stock, &c. seem to be much the same as in Canada. Horses cost from L. 18 to L. 22, 10s.; oxen from L. 15 to L. 18 a pair. Mechanics are establishing themselves wherever demand for their labour is found. The lakes and rivers abound with fish, as trout, white fish, bass, &c., and game is plentiful. The Indians are found in the more remote parts of the country, but they are perfectly harmless, and seldom come near the settlers.

Such is an outline of the account I received of Michigan, and which, I have no doubt, is, in all essential particulars correct.

I may add that, from the rapid improvement which has even already taken place, in regard to communication, the journey from Michigan to New York is easily accomplished in six days.

In 1820, a Government Expedition was sent into the western country, for the purpose of ascertaining the natural

advantages and productions. The report is highly favourable to the fertility and capabilities of Michigan. An extensive range of country upon the river and Bay of Saganaw, on Lake Huron, is spoken of, in terms of high admiration, for the richness of the soil, and natural beauty of the scenery, and also as presenting uncommon inducements to enterprising and industrious farmers and mechanics, from its central and advantageous position for business. Saganaw Bay is about 60 miles in length, and 30 miles wide, with numerous fine islands. It is 180 miles west of Detroit. Game is mentioned to be very abundant, consisting of deer, bear, brown rabbit, or hare, weighing about 6lb. partridge or grouse, pigeons, ducks &c. *Fox River* is also specially noticed as highly desirable for settlers, in regard to quality of soil, beauty, and local advantages. It runs into the west end of Lake Michigan.

I made out a rough estimate of a supposed investment in Michigan, and having submitted it to the correction of competent judges, acquainted with the present state of the district, it may perhaps be useful to insert it, especially as it applies also to much of Upper Canada.

Price of 160 acres, at $1\frac{1}{4}$ dollar, is	200 dollars,	or L. 45	0
Expense of seed, labour, (say 150 acres), and	...	...	...
rail fence, at 6 dollars	900	...	202 10
Harvesting at 2 dollars	300	...	67 10
Cost of dwelling-house, stables, &c., . . .	800	...	180 0
	2200	L. 495	0

<i>Returns.</i> —Produce of 150 acres, (20 bushels per acre) 3000 bushels, at	
1s. per bushel,	L. 675
	Deduct 495
	<hr/>
	L. 180 clear.

The dollar is taken at 4s. 6d. No allowance is made for maintenance, and it may be said that the expenses are underrated. The above estimate, however, is given upon

pretty good data, and as the settler will certainly repeat the wheat crop for at least one or two seasons more without any deterioration, and becomes likewise free owner of land and houses, he may afford to double or treble that item, or to take a smaller return per acre, or a lower price per bushel, and still be very well off. The return was stated to me at 25 or 30 bushels per acre at an average, and a dollar was the price given last season without any particular excitement. The houses are of a superior description, the dwelling-houses being supposed to contain seven or eight rooms, with kitchen and other domestic offices attached.

A good deal of discussion took place before the Emigration Committee, upon the probability of settlers being able to refund a portion or the whole of the sums advanced by Government on their account. Should there be any foundation at all for the statement I have here given, it is abundantly clear, that Mr Wilmot Horton's expectations on that head may be very easily realized.

The tide of emigration is at present setting very strong into Michigan. It is stated in the *Detroit Courier* of 26th May last, "that the sales of public lands up to 5 o'clock yesterday, amounted to 20,700 dollars! On two several days, they exceeded 5000; one day, 5600. The total amount, in this district alone, since the 1st of March, is 48,727 dollars."

Products of Michigan.—The cotton plant, the grape-vine, the sweet potato of Carolina, tomato and the egg plant were all successfully cultivated last year. The prune tree will be planted this season. The mulberry is becoming extensively cultivated.

The period cannot be remote when pauperism must become an object of anxious investigation, as it already is of deep solicitude to every wellwisher of his country, and must be followed up with measures of energy and decision adequate to the political and moral importance of the subject.

While it may well be esteemed a dubious policy to pamper population by any permanent system of encouragement, few thinking minds will deny that the existing pressure, (whether it be an actual excess or not), ought to be forthwith removed, and with no farther delay than the discovery of a safe and practicable vent may require.

Whether we contemplate the mass of wretchedness and sickening hopelessness in which thousands of well meaning labourers and artizans are at this moment plunged, or the absorbing demands which their necessities occasion, by the amount of parish rates, all must concur in the anxious wish, that some remedy may be ere long devised. We have written and said so much upon this subject, that, from the very attempts to throw in light, it has become marvellously mystified and confused. Neither is it to be concealed that considerable and conflicting difficulties exist, though it is believed and hoped, none which patient investigation and a liberal policy may not overcome. It may be reasonably assumed, that parishes distressed by rates will readily concur in a fair and final composition, which is to free them from a heavy and a growing annual charge. Government, on the other hand, by receiving such funds, and making simple and economical arrangements, may not only relieve the pressure at home; but will also confer happiness and independence upon those who have unhappily occasioned the distress. Neither does it seem necessary to open the public purse for this desirable object; on the contrary, by a judicious selection of settlements, and reserving lots of government lands adjoining those devoted to emigrants, there can be little doubt that, in a few years, considerable sales may be effected. The man who finds himself and family comfortably and conveniently settled upon fifty or an hundred acres, will ere long be willing and able to pay for a like quantity, which has been left along side of his farm, and in this way Government may be amply reimbursed.

In regard to the question of place, Upper Canada would

seem, on many accounts, to be most appropriate; nor can I bring myself, for a moment, to put Tasmania, New Holland, &c. in competition, however high the eulogiums which my respected friend the Editor of the Journal of Agriculture has passed upon Australasia. A pestilential and impure moral atmosphere hangs over these colonies, which will require a very long period to dispel; and although this can be certainly best effected by a wholesome infusion of character from home, it must prove a heavy sacrifice to those individuals, who undertake the task. The climate, the soil, the accessibility of North America, with various other circumstances, offer nearly an assurance of success. The experiments hitherto made by Government, in those colonies, although far indeed from having failed, might certainly have been conducted, in a more satisfactory and economical manner.

The settlers sent out by Government have been of that class which could contribute nothing but manual labour, and the transaction must necessarily assume a very different aspect, if parishes are called upon to bear a principal part of the expense. Settlements have been established also in a manner not quite judicious. They have been dropped too much at random, and at remote distances from each other, deprived of all the comfort and support which a more concentrated system would have produced.

It is obvious that, in dealing with our dead weight of population, two classes must be formed, viz. those who *can*, and those who *cannot*, bear a certain portion of the necessary expense of removal. With the first of these descriptions of emigrants it will not be very difficult to make suitable arrangements, and as to the latter, there can be no doubt that much good may be attained by the establishment of an honourable and active agency in Canada, to ascertain and register the wants of the colonists, or public works, in regard to servants, artisans, and labourers, to receive and husband any

small funds which the emigrants may possess, and generally to supply a link in the chain, which is at present assuredly wanting. In this way, communications might be made to the mother country of the probable supply required for the ensuing season, and much distress and disappointment prevented. It may be said that Government has, at this time, emigrant agents in Canada, and such is truly the case. But these gentlemen are engaged in mercantile pursuits, and are in many respects disqualified for establishing that connection between the colonists and emigrants, which, it is thought, may be advantageously procured.

To some men, and those too of no ordinary stamp, emigration, under any modification, is an object of dismay. Viewing it as palpable encouragement of evil, which it professes to remove, they cannot be induced to countenance it, under any circumstances. It may be doubted, however, whether theory is not carried by such economists rather too far; and it is not unreasonable to hope, that, by taking off the surplus which so many portions of our land present, a better system might be introduced in regard to parish paupers, leading or compelling the people to adopt that moral check, which sound politicians and moralists agree can alone effectually preserve the labouring classes in a wholesome state of numbers, and tend to apportion the supply of hands to the labour which is provided to be done. The system of removing paupers to Canada has been already partially adopted by some English parishes, and I had a personal opportunity of witnessing the inadequacy of the arrangements, in regard to a large party in Somersetshire, that arrived in Quebec, while I was there,—I think there were one hundred and fifty, seemingly of the class of agricultural labourers, and they were under the charge of a respectable parish overseer, whose duty it was to have justice done to them on board ship, and to land them at Montreal. There, they were to be absolutely cast a-drift, each man receiving

L. 4; but no arrangements having been contemplated for locating them, or for providing work, they would very quickly be relieved of their cash by the tavern-keepers, and left destitute, a heavy burden to themselves, and a nuisance to the province.

Had the money been secured and judiciously expended, it would have sufficed to place them in comfort and independence. Some weeks after, I met with several of these poor fellows, in the Upper Province, wandering about in search of service or employment.

In this case, the fault lay in the system, not in the emigrants; but there are innumerable instances, where the emigrant has only to blame himself for failure and disappointment. The history of a Yorkshire farmer and his wife, who returned to Britain in the same packet with myself, will, in some degree, illustrate this position. An unmarried uncle, who had emigrated to America, returned to England, for the purpose of realizing a legacy, and gave such accounts of Michigan (for it was in that land of promise the scene lay) as to induce this man and his wife to emigrate also, about two years ago. He was a stout, steady looking man, in the prime of life; the wife seemed very little calculated for encountering any hardship. Upon conversing with him, I found him totally ignorant of the distinguishing features of Michigan. He said land was "fair enough; that his uncle offered him eighty acres to himself, but that it was not worth having; it was *no farm*, it was *all wild*, and a loghouse (the wife added) just fit for pigs." The uncle then proposed to him to work his *made* farm, on shares, by which he would have had one-half to himself; but neither did this suit his expectations. "He said that was merely to make him toil like a *slave*, when his uncle would live like a gentleman; he had never been a servant to any man, and he would not begin in America, if he could find bread in England."

In short, a child died, the wife took a disgust at the coun-

try, and here he was on his way home, after spending time and money to no useful end. I am not sure but there was a little of *diamond cut diamond* in the family adventure, and that, while the uncle perhaps looked on the nephew, as a likely fellow to manage his farm in Michigan, the other had been making some shrewd speculations upon the legacy of L. 1000, which had given immediate rise to the emigration.

And now comes the important question for individual consideration, "Is emigration expedient or not?" This must be decided by circumstances, and every man must judge for himself. Of this, however, I think there can be no doubt, that either the moderate capitalist, or the frugal, sober, and industrious labourer or artisan cannot fail of success. *Fortunes* will not be rapidly or even readily acquired; but it must be the settler's own fault if he does not enjoy, in large abundance, every solid comfort and enjoyment of life, and rear around his table even a *forest of "Olive plants,"* without one single anxious thought regarding their future destination or provision.

And now, gentlemen, I have only to apologize for the unexpected length, to which this communication has extended, and to assure you how sensible I am of its many imperfections. I have the honour to remain, gentlemen, your most obedient servant,

ADAM FERGUSSON.

REMARKS ON AN ARTICLE ON THE SALMON FISHERY, IN
THE QUARTERLY JOURNAL OF AGRICULTURE, ADDRESSED
TO THE DEPUTE-SECRETARY. *By H. HOME DRUMMOND,
Esq. of Blair-Drummond.*

IN the concluding paragraph of an able article on the Salmon Fishery, in the last Number of the Quarterly Journal of Agriculture, I was sorry to find some very erroneous statements as to *the close time*, the circulation of which, without contradiction or answer of any sort, may have the effect of propagating very mistaken notions on that subject. In other respects, the author's views are much the same as my own, and I very much regret that he had not bestowed a little more attention on his concluding remarks. If he had examined with any care the Act 9th Geo. IV. cap. 39., for "the Preservation of the Salmon Fisheries in Scotland," he could not have so expressed himself as to convey an impression, that a heavy expense for a river police is imposed by the statute; for the proprietors are not obliged to have any police or assessment, unless the majority, in number and value, think proper; and the amount and application of the assessment are entirely left to their own discretion. If, therefore, the "system" be "somewhat expensive," the proprietors themselves ought to be blamed, and not the law.

"But of all the blunders," he says, "which have been committed on this subject, where blundering is the rule, and sense or judgment the exception, one of the greatest undoubtedly is the appointment of the same close time for all the rivers in Scotland. It would not have been one whit more absurd and preposterous to fix by law the same harvest-time for all Scotland, and to ordain that, in the late as well as in the early districts, people should begin to reap on a given day, and leave off on a given day. There are early

and late rivers, as well as early and late districts; and in some, the salmon are only just beginning to ascend when the fishery has terminated in others." There can be no doubt that salmon ascend some rivers at an earlier season than others, but I am inclined to think that the difference is not so great as is generally supposed; and that, if the close time were extended over so long a period as it ought to be, in order to afford the restraint upon the use of this peculiar species of property, which is necessary for its profitable enjoyment, such a period would comprehend the breeding season of every river. Some years ago, I had occasion, along with Mr Kennedy, and Mr Brandling, then member for Northumberland, to compare the answers to some queries on this subject, which had been circulated to every salmon fishery in Great Britain and Ireland, in order to state the result to the Salmon Fishery Committee; and the conclusion to which we came, on making this comparison, amply confirmed the opinion already expressed.

The passage above referred to, would seem to imply, that the late statute introduced, for the first time, "the great blunder" of a general close time into Scotland, whereas, with the exception of the Border rivers, and some others of no great consequence, the act 1424, quoted in the preamble, has always been the law on the subject, whatever may have been the practice; and every one knows that the salmon fishery was formerly an object of the greatest importance, and often engaged the attention of the Scottish legislature. If there were not a common close time, the difficulty of enforcing any local regulations would be very great; and if different streams were to have different seasons, as being somewhat earlier or later, different fisheries in the same river might, on the same grounds, make as strong a claim for a similar indulgence. Indeed I believe there is less diversity between different rivers in this respect, than between different parts of the same rivers; and as there is hardly an ex-

ample of any valuable fishery exclusively the property of one individual in its whole course, the important question is less between different fisheries, than between the contending interests of upper and lower heritors. Now, nothing can be more inapplicable than the illustration of "the harvest," to a property of the nature of a common right, where one man's gain is another's loss, and where the future profit of all chiefly depends on a general system of restraint on the present enjoyment. If the quantity which some proprietors were to reap depended on what others should leave, and if seed-corn could be procured from no other source, the interference of the law, to regulate the use of the common property, would not, I apprehend, appear either "absurd" or "preposterous."

From this illustration of "the great blunder," the writer proceeds to an example. He adduces only one, and that is the Tay, where he says,—“The fish are at their prime from the end of January to the middle of March; but, according to the new close time, not a salmon can be caught till the middle of the latter month.” Now, the time fixed by the statute for commencing the fishery is the 1st of February, and it is closed on the 14th of September, the very time when, he says, “they are no longer marketable;” though he adds, that, “according to the new regulation respecting close time, they may continue to be caught till the middle of October, when they are fitted rather to serve as poison than as food.” I shall only remark on this passage, that I regret very much to see an intelligent writer use such strong language as to an act of the legislature, without having taken the slightest trouble to ascertain what the law is which he censures. If, however, I may venture to suppose that he is better acquainted with the facts than with the law, I may add his testimony, so unintentionally given, in support of the precise period of close time fixed by the act, to the favourable opinions already conveyed to me from various quarters, and

especially from some of the greatest proprietors of the Tay fisheries, as to the operation of this enactment.

The truth is, the anxiety to catch more fish is altogether a delusion, as the rivers are almost everywhere overfished, and the restraint of the present close time is not sufficient for the purpose for which it is intended, nor so great as a prudent man, who might be sole proprietor of one river, and of all its tributary streams, would impose upon himself. The fisheries of the principal rivers are generally very much divided among different proprietors; and in discussing the questions that arise, one is apt to attach too much importance to local circumstances, and to overlook the remote effects upon the general interest. There is probably no river to some portion of which, considered by itself, the beginning or end of the present close time may not be more or less inapplicable; but I am convinced, that the late extension of the period, from the middle of December to the 1st of February, has been generally beneficial; and I only regret that my wish was not accomplished, of fixing the commencement of the close time on the 1st, instead of the 14th, of September,—as, in most of the important fisheries, a large proportion of the breeding fish, on which the supply depends, ascend during the first fortnight of that month.

Various causes have contributed to diminish the quantity of salmon caught in a large proportion of the Scotch fisheries, and I fear these causes must continue to operate with increasing force. This state of things naturally tends to stimulate the exertions of the fisherman, to supply the deficiency by more ingenious contrivances and more unremitting industry. But there cannot be a more pernicious error on the part of proprietors, than to indulge the imagination, that, under these circumstances, they may with safety admit additional facilities for the destruction of the property in which they have a common interest, for the preservation of the breed.

BLAIR-DRUMMOND, }
22d July 1831. }

REMARKS ON THE PRINCIPLES, AND ON THE DEFECTS OF THE
VARIOUS SYSTEMS, OF LIFE ASSURANCE. *By Mr WILLIAM FRASER, Edinburgh.*

[The following communication has been inserted in the Society's Transactions, with a view to call the attention of the tenantry or farmers of Scotland to the subject of which it treats. It is believed that very few of this class of the community are aware of the great advantages to be derived from Life Assurance, not only, in case of death, to their families or representatives, but also to themselves during life. From the vicissitudes of the seasons, the fluctuations of the markets, and the perishable nature of their commodities, practical agriculturists are often placed in situations of greater unforeseen difficulties than those of any other profession. Their credit, too, is perhaps more limited, owing to the hypothec always possessed over their stock by the landlords, and from its often not being in their power to offer any other security for pecuniary accommodation. In such circumstances, the possession of a policy of Life Assurance would frequently be found of essential service, for, if it had been issued by a liberal office, its value, after a certain period, and under a reasonable deduction, could at any time be obtained ; or, if credit for a greater amount, perhaps rendered necessary by agricultural improvements or otherwise, were wanted for a limited or indefinite period, the policy could be assigned to the creditor as a most effectual security for repayment, in the event of the death of the debtor in the interim. Moreover, to proprietors of lands or other property encumbered with annuities, or other life interest, —to persons, in the possession of entailed estates, wishing to make provision for the

female and younger branches of their families,—to trustees named in marriage-contracts, or in other family settlements—and, in short, to all of the middle and higher ranks, the benefits of Life Assurance, on a large scale, are well known to be capable of being turned to good account.

Of late years, however, a pretty general opinion has prevailed, that the rates of premiums required by the more popular associations for Assurance upon Lives have been needlessly high, and some ground has doubtless been afforded for this idea, by the statements and tables of the various offices themselves differing so widely from each other. In a matter of such importance, therefore, and for the reason also, that its fundamental principles have been hitherto so little understood, it has been conceived that the following communication might prove acceptable to the public; and whatever opinion may be formed of the views therein contained, it is certainly some recommendation in their favour, that they appear not to have been advanced without due consideration, and that they are to be immediately applied to practice.]

AMONG the many and important objects to which the attention of the Highland Society of Scotland has been successfully directed, perhaps none occupies a more conspicuous place among its records, than the result of the investigation, in 1820, for ascertaining the rate or Law of Sickness experienced among the members of Friendly Societies. These institutions, it is well known, have long been of great service in ameliorating the condition of the working classes, when overtaken by sickness, old age, and death, and also in materially diminishing the demands upon public and private charity. Owing to the want of proper data, however, for calculating their contributions and allowances, all these societies had been

found to go ultimately to ruin, and thereby to entail not only poverty and distress upon many of their industrious members, at an advanced period of life, but also heavy burdens upon the community at large. In some instances, indeed, the dissolution of a Friendly Society has been known to treble all at once the poors' rates of the surrounding parishes, and, of course, to diminish the value of property in no small degree.

To put a stop to such disasters was the object of the arduous undertaking above referred to; and although many prejudices and difficulties were met with at the commencement, yet these were all ultimately overcome, by the zeal and indefatigable exertions of the Committee who had been appointed to conduct the inquiry; and the public was favoured, in 1824, with their invaluable "Report on Friendly Societies," detailing the information which had been procured, the various errors which were found to have been committed by these institutions, and containing numerous rules and tables for their guidance in future. Various Friendly Societies have been since instituted, and successfully conducted, in different quarters of the kingdom, upon the improved and scientific principles recommended in that Report.* These are now rapidly increasing, and even although their contributions are somewhat higher than those of the old institutions, yet the former are preferred, as it has generally been found impracticable to improve the schemes of the latter.

The importance of the subject, and the new views deve-

* The principal of these improved societies on a large scale are—The Edinburgh School of Arts Society, the East-Lothian Mutual Assurance Society, the Leith Mechanics' Society, the Glasgow John Street Society, the Aberdeen Mutual Assurance Friendly Society, and the Dunfermline Friendly Institution; the whole of these have been highly patronized and supported by all ranks of the community. Of those societies on a smaller scale, in and around Edinburgh, the following may be mentioned—the Societies of Compositors (the first established upon improved principles)—of Goldsmiths—of Cabinetmakers—and Shoemakers (Royal St Crispin)—the Heriot's Society—the Edinburgh New Philanthropic—the Colinton,—and the Slateford Friendly Societies;—also the Paisley Equitable, and the Methven, Friendly Societies.

loped, soon attracted the attention of the Legislature. In 1825 and 1827, two Select Committees were successively appointed by the House of Commons for making still farther investigations. They did not confine their attention to the rate of sickness only, but went into a wide field of inquiry as to the law of Mortality, and various other matters connected with Health and Life Assurance. A vast mass of additional and very important information was thereby obtained; and ultimately, in June 1829, a statute was passed for the better regulation of Friendly Societies throughout Great Britain and Ireland. Thus, on this particular subject alone, independently of the many others which have engaged their attention, have the Highland Society of Scotland had the satisfaction of speedily seeing their labours become of great national importance, and the measures and principles recommended by them for securing the utility and permanence of these associations enacted as a statutory law of the land.

In the "Report on Friendly Societies," however, it was stated as matter of regret, that the inquiry had been confined to the age and sickness only of the members of these societies, and had not also been extended to *deaths*, as the rate of mortality formed a principal element in calculating the necessary contributions for sums to be paid at the decease of members, their wives, and widows. To supply this defect, an average of three existing tables of mortality had been adopted, and the requisite payments for sums at death were calculated from that average rate, and at 4 per cent. interest. But upon these payments or premiums being found to be much lower in proportion than those required by Life Assurance Companies, it was strongly maintained by many that a great error had been committed in taking so low a rate of mortality as the basis of the tables in the Report, and consequently that it would be very unsafe for any society to act upon them. That this opinion was completely erroneous, however, has been since sufficiently demonstrated in the course of the

Parliamentary Inquiries before referred to; and the object of this paper is to show, by the same high authority, that the rate of mortality adopted in the calculations of Life Assurance Associations is altogether inapplicable to their class of members,—that their rates of premiums have been hitherto exorbitantly high,—and that their systems are all more or less adverse to the interests of the assured. Should the remarks upon this subject be considered worthy of a place in the Transactions of the Highland Society of Scotland—as being somewhat connected with their former publication on the principles of Health and Life Mutual Assurance, and as proving the sufficiency of the rates of contribution then recommended for sums at death—the details may be treated of in the following order.

I. Objections to the present Systems of Life Assurance Associations.

While the great utility of Life Assurance has now become very generally known, and begun to be duly appreciated by all classes of the community, the late Parliamentary investigations regarding Friendly Societies, before alluded to, and also that concerning the Government Annuitants, have produced a great improvement in the details of the science. Most of the uncertainty and difficulty by which it has hitherto been supposed to be attended have been cleared away, and Life Assurance transactions may now be calculated and managed with nearly the same accuracy and simplicity as those of any common mercantile concern.

The case was very different in the earlier periods of Life Assurance. Its principles were but very imperfectly understood; and from this cause, as well as from the defective tables of mortality in use, several institutions were founded upon very erroneous calculations, and have been since carried on upon any thing but equitable or scientific principles; and others more recently established have, with slight modifica-

tions, followed the same plan. By all of these the premiums required for sums payable at death are uniformly much higher than necessary. In Proprietary Companies, the excess of premium is a complete loss to the assured, as the proprietors appropriate it exclusively to themselves; while in Mutual Guarantee associations, there arise much trouble and expense, and a great inequality in the adjustment, from the necessity of periodically apportioning to each individual a share of the large aggregate surpluses.

Two reasons are usually assigned for still exacting such excessive premiums. The proprietary companies allege, that, as they guarantee the assured in payment of their policies by a large subscribed capital, and for a long period after outset run a great risk of loss, so, on the other hand, they are entitled to be recompensed by the assured for such obligations. The mutual guarantee associations, again, acknowledge that their premiums are too high, but assert that this signifies little to the members, or rather is beneficial to all concerned, because, while the institution is thereby rendered more secure, the accumulated surplus is periodically added, under the name of *bonuses*, to the policies of the subscribers.

Both of these reasons, however, are quite fallacious. The risk at first is next to nothing. The chances are only about 100 to 1 against an ordinary life of thirty years of age failing in one year; 100 times 100, or 10,000 to 1, against two named lives of that age both failing within the year; and 100 times 10,000, or a million to 1, against three of that age dying in the year. But if this be true of ordinary lives, as every institution begins with select lives, the odds are still greater against rapid mortality among the members, during the first few years of an establishment. The celebrated Dr Price long ago stated, "that it is not to be expected that any society can meet with difficulties in its infancy;" and experience has since amply demonstrated, that, of all undertakings, a Life Assurance association, from the premiums

being paid in advance, and from there being no risk of bad debts, the least requires capital at the commencement ; and, in proof of this, it may be affirmed, that no instance can be given of any such institution, under proper management, ever requiring any part of a subscribed capital to make good the policies of the assured.

For Mutual Assurance associations, the only preliminary precautions are, that the lives be select, and that the extent of the individual risks at first be proportioned to the number and ages of the members, so that their collective annual premiums may of themselves, in one or two years at most, form a sufficient fund for meeting every probable demand. With regard to the requisite premiums, it is certainly proper that these should be always made such as fully to cover the risks assured, and to defray the expenses of management ; but it is difficult to conceive why they should, in general, be 40 or 50 per cent. more than necessary. The value of the prospective claims against Life Assurance Companies may now be calculated with very great accuracy, as even the periodical computation of a surplus necessarily implies ; and hence there is no necessity for taxing the members to accumulate a large surplus fund, merely for the purpose of being again divided and distributed to their representatives under the name of bonuses.

Besides, the bonus system is any thing but a just or equitable one. The surpluses have chiefly arisen from fewer deaths occurring among the members of the younger and middle ages than were calculated to happen by the mortality tables hitherto in use ; as in the more advanced ages these tables are pretty nearly correct, and, consequently, little or no surplus then arises from the contributions of the older members. Such being the case, the latter should then also cease to derive any, or at least should derive comparatively little, additional benefit from a subsequent extra accumulation of capital ; whereas the practice is for all, after a certain period of contribution, to participate alike, in proportion to the

sums assured, but without any regard to their ages. Hence it follows, that, at the commencement of such an association, the first or youngest class of entrants secure to themselves all the benefit of their own surpluses; but while the excess from their premiums must always continue to decrease, and, after a certain age, must nearly cease altogether, still they continue to participate in the surpluses of every succeeding class of members. Thus the first class gain at the expense of the second; the first and second at the expense of the third; the first, second and third, at that of the fourth, and so on—the surpluses accruing to the last or youngest class of entrants being always diminished in proportion to the number and ages of those who had entered before them. Young and good lives, therefore, can have no inducement to enter such a society, after it has been for some time in operation.

It is usual for institutions of this kind to refer the public to the large sums of bonuses which have been added to the policies of the original members; but it will be perceived that it by no means follows that similar additions will continue to be made to the policies of all future members. So long as institutions upon this principle can obtain an increasing number of young entrants, the surpluses may at one or two successive investigations appear to be of the same or perhaps even of an increased amount; but should the number become stationary or decrease, or the ages of the entrants be higher, while the ages, and consequently the mortality, of the existing members increase, the surpluses would soon begin to diminish, and would ultimately cease altogether. It will then be found by all but the first or second class of the original entrants, that the additions to their policies will by no means be a recompense for the heavy extra premiums to which they are subjected through life.

But there is still another strong objection to the usual mode of dividing the surpluses. To the sum assured, at whatever time the death may happen, the representatives of

the assured are justly entitled, because that is the nature and object of the contract; and the aggregate premiums of the long and the short lived, should, if properly calculated, be made fully adequate to the policies of both classes in the long run. But the right to participate in a surplus fund depends upon a very different principle, namely, whether the claimants have in reality contributed towards that surplus. Whether the excess of capital arise from a low rate of mortality, from profitable investments of capital, or from forfeitures, it is obvious that none of the surplus can in equity belong to any member till such time as his premiums, with the accumulation of interest, exceed the sum to be paid at his death. All those who die previous to this period evidently create a loss to those who live beyond it; and as it is therefore chiefly from the contributions of the latter class that profit has ultimately arisen, it is but fair that they should have the benefit of it, instead of sharing it with the representatives of those who may have died before paying perhaps one-fourth of the specific sums assured by their policies.

In short, it is now universally admitted, that the awkward and expensive system of superfluous exaction and subsequent increase of policies is highly objectionable, and wholly unnecessary in the present improved state of the science of Life Assurance. "My view in all cases is," said the very eminent mathematician Mr Babbage, in his evidence before one of the Select Committees of the House of Commons, "let us get as nearly as we can the law of mortality of the class for which we want to calculate, and add to the prices computed from it some proportional part, sufficient to insure the safety of the establishment which uses them. I strongly object to using tables giving a greater mortality than is expected to take place, a course which has sometimes been defended on the ground of safety to the establishment. Safety is much more certainly secured by judging as nearly as possible the true risk, and adding an additional sum for security. If tables not

representing the mortality of the class for whom they are designed are employed, every step in the reasonings which are deduced from them is liable to increased error; and if the calculations are at all complicated, the errors so introduced may not improbably act on the opposite side to that which they were intended to favour."

II. Summary of the Results of the late Investigations into the Rate of Mortality among Select Lives.

It is well known that by an Assurance on Life a certain annual premium during the life of one party, or, in lieu thereof, an equivalent single sum, is agreed to be paid on the one hand, in consideration of a stipulated aggregate sum being paid at the death of an individual on the other. The payer of the premium is called the Assured, and those undertaking the risk the Assurers. The single or annual premiums of one person with another must be proportionate to their ages at the time of the contract, and to the sums to be paid at death. For ascertaining the requisite premiums for any sum at death, the rate of human mortality, and the rate of interest at which money may be improved, form the elements of calculation.

The table of mortality formed by Dr Price upwards of sixty years ago, and denominated the Northampton Table, has been hitherto adopted by mostly all Life Assurance Companies. Having been constructed, however, from the deaths occurring among the population at large of the town of Northampton and neighbourhood, and under certain other disadvantages, in so far as regards the purposes of assurance on lives, it has been ascertained beyond a doubt, both by public and private investigations, that this table by no means shews the mortality occurring in this country in general, far less among a select class of lives, such as those of annuitants, or the assured in life offices, but represents the mortality as greater.

In 1809, another table of mortality was deduced by Mr Joshua Milne of London, from the register of deaths kept at Carlisle during a period of nine years. This table exhibited a considerably longer duration of life than that of Dr Price, and was found to agree very nearly with the mortality which had occurred during a great number of years among the numerous members of the Equitable Life Assurance Society of London.

Tables of mortality had also been calculated both by Dr Price and Mr Milne, from actual enumerations of the people, at different ages, made with great accuracy throughout the kingdom of Sweden, and the latest of these tables shews a mean duration of life very little less than the table deduced from the observations made at Carlisle.

In this state of matters, the Committee of the Highland Society of Scotland, when calculating the tables before referred to for Friendly Societies, were much puzzled with regard to the rate of mortality to be adopted. It was, however, agreed by all, that the Northampton Table was inapplicable, and therefore, by the advice of several scientific gentlemen, well qualified to decide, the Committee ultimately resolved to take an average of the Northampton, Carlisle, and Swedish Tables; and a new table of mortality was calculated from these accordingly.

As already mentioned, in 1825 and 1827, two Select Committees of the House of Commons were successively appointed for investigating the rate of mortality, with a view to an amendment of the statute relative to Friendly Societies. In the course of these inquiries, the actuaries or managers of the greater number of the Life Assurance Companies of London, as well as several other gentlemen, were examined, regarding the rates of mortality, both among the working and the higher classes of the community, all of whom, with one or two exceptions, declared it to be their decided opinion, founded on experience, that the Northampton Table exhibits a much greater mortality than has been ever found to occur among a se-

lect class of life assurers *. In particular, Mr John Finlaison, actuary to the National Debt Office, and who had been appointed by Government in 1819 to ascertain the rate of mortality among the State Annuitants, completely confirmed these opinions by a vast mass of documentary evidence, being the result of eight years' investigations into the mortality experienced among these annuitants—the members of the great Irish Tontines—the pensioners of the army and navy—and other public bodies. Mr Finlaison was subsequently ordered by the Lords of the Treasury to prepare a detailed report, showing the conclusions to which he had come, and the evidence upon which they were founded, in order to be submitted to other scientific persons for their opinion. This having been done †, his tables were finally approved of by Government; by these the prices at which Government grant annuities are now calculated, and they must soon supersede all other tables for annuity and life assurance purposes;—"and with good reason," as Mr Finlaison had remarked, "for they have been eight years in preparation, with all the means for perfecting them which the Government could supply, and to which no private individual had access."

III. *Prejudicial Effects of an erroneous High Rate of Mortality upon the interests of the Assured.*

The discrepancy between the Northampton, Carlisle, and Mr Finlaison's tables of mortality of males and females

* "The evidence appears to your Committee to be strong and decisive in favour of the use of tables which give an expectation of life higher than the Northampton. In truth, there is not even a *prima facie* case in their favour. It is admitted that these tables were originally formed in a degree upon hypothetical data; the observations upon which they were founded come down no further than the year 1780, or at the latest to 1791; and it is not affirmed that they have been verified by any actual and subsequent observation, or by the experience of any society which has endured for a period sufficiently long to bring to a sure test the accuracy of its calculations."—*Report of Select Committee of House of Commons on Friendly Societies in 1827.*

† Report to the Lords of the Treasury, ordered by the House of Commons to be printed 31st March 1829.

combined, will be seen by the following brief comparative view :

One individual with another, at the age of 25, may be expected,	
by the Northampton Table, to live . . .	30 $\frac{3}{4}$ years,
by the Carlisle Table,	37 $\frac{3}{4}$ years,
and by Mr Finlaison's Table,	38 $\frac{1}{2}$ years;

thus shewing a difference from the Northampton Table of seven years longer life by the Carlisle, and of nearly eight by Mr Finlaison's ; the effect of which on life assurance is, that a company whose premiums were strictly calculated by the Northampton Table, and at 4 per cent. interest, would take from a person insuring at the age of 25, for L. 1000 at death, an annual payment during life of L. 22 : 7 : 5 ; while, if these premiums were computed, even by the Carlisle Table, and at the same rate of interest, the annual payment would be only L. 15 : 3 : 5. The difference is here L. 7, 4s. per annum, independently of the usual additional percentage, and if this be accumulated for thirty-eight years, the average number he may be expected to contribute, the principal and interest overpaid will amount to no less than *Six hundred and nineteen pounds*. This large sum is the loss to a person who may die at the early age of 63, but to those who may live five, ten, or fifteen years longer, the loss must obviously be very great*. It is to be observed, too, that the above overpayment is only for males, and that the loss would be still somewhat more to females—the mean duration of female life having been long known to be greater than that of

* "According to the Northampton Table, out of 1000 persons existing at the age of 25, there survive, at the age of 65, 343 persons; by the Carlisle Tables, which are believed to approach more nearly to the truth, no fewer than 513 persons will survive. Of the 343 persons, who, according to the Northampton Table, would be alive at the age of 65, 98 would live for 15 years ; but, according to the Carlisle Tables, 165 persons would survive through that period, and attain the age of 80 years."—*Report of a Select Committee of the House of Commons on Friendly Societies in 1827.*

males, and which is now proved beyond a doubt by the labours of Mr Finlaison, but on account of which no deduction has, till very lately, ever been made by Life Assurance Companies, and only now by one or two of them *.

Besides, the premiums have been still farther increased by the tables having generally been calculated at 3 per cent. interest, whereas, under proper management, it is always easy to obtain a higher rate. The Government securities alone, in which the greater portion of the capital of Life Assurance Companies is usually invested, have for a long period afforded an average of 4 per cent.; and there are various modes of investment by which even a still higher rate is obtained.

It will now be obvious how the large surpluses and profits of Life Assurance Companies have arisen, independently of what may have been derived from forfeitures, and that a considerable reduction in the premiums might be made with per-

* "Although in England (where financial transactions, of which the only measure of value consists in the accuracy of some known law of mortality, are of vastly greater magnitude than perhaps in all the rest of Europe put together), any inequality in the longevity of the males as compared with the females has been, and is to this day neglected; yet it is not the less certain, that all who have pursued these inquiries have, any time these eighty years, been perfectly well convinced that a great and substantial difference existed. It is hoped that the annexed observations will remove all doubt whatsoever on that subject. They demonstrate that, except under the age of 12, and above the age of 85, (extreme periods in which perhaps no distinction of the mortality is apparent,) there is at every other period of life a remarkable and decided advantage in favour of the female. This is first most evident about 14, after which the mortality among the female sex is observed to proceed onwards to the age of 55 with the slightest imaginable increase, contrary to many received notions that child-bearing and nursing entail on this sex a severe mortality in early life, and that in the earlier stages of the decline of life they are also subject to many casualties; all which is utterly disproved by the fact. It is not true, but quite the contrary, therefore, that married women incur greater danger than the single; and reasonably may this conclusion be admitted, when it is considered that the married are, in the first instance, in regard to health and strength of constitution, always the *élite* of the whole sex, the unhealthy not choosing to marry. After 60 the female mortality advances more rapidly, but is always, until the age of 80 at least, very decidedly less than that of the males."—*Report by Mr Finlaison to the Lords of the Treasury, on Life Annuities, dated 28th March 1829.*

fect safety, by a new institution having no such object as profit in view *. This has no doubt been denied ; but Mr Babbage, in his excellent “ Comparative View of the various Institutions for Assurance on Lives,” published in 1826, has incontrovertibly exposed, and very strongly condemned, all the reasons which have been given for the exorbitant premiums required both by Proprietary and Mutual Assurance Companies. Moreover, the experience of the Equitable Mutual Assurance Society of London, shewed the deaths, during a period of forty-two years, to have been only in the proportion of two to three ; that is to say, that society had only paid *two* claims, whereas it had been calculated by the tables that *three* would have fallen due † ; and, from a statement lately circulated by the Scottish Widows’ Fund and Life Assurance Society, it appears, that although, in calculating their premiums, the Northampton Tables had been somewhat modified by a higher rate of interest than usual being adopted, still, *even after laying aside a third of the surplus capital*, as a “ fly-wheel,” or fund of reserve, a bonus of upwards of 37 per cent. fell to be paid in 1830, in the event of the de-

* Forfeitures, or policies abandoned, have hitherto been a source of considerable gain to Life Assurance Companies, as on that event many of the offices made no return for the value of policies, and even those who did, returned but a very inadequate sum. In future, however, the profit arising in this way will be greatly diminished, for the public are now becoming better acquainted with the details of life assurance, and the offices will therefore be soon under the necessity of dealing with their members, in cases of forfeiture, on a more equitable footing. By means of one or two tables, and a few simple rules, which are appended to their articles, several common Friendly Societies enable their members to ascertain for themselves the true value of their interests or policies, a due proportion of which, under certain limitations, they are entitled at any time to demand, in case of their inability to remain longer members.

† In 1820, the accumulated fund of the Equitable Society of London amounted to L. 6,235,000 Sterling ; and at 1st January 1830, the date of the last periodical investigation, the accumulated fund amounted to the immense sum of L. 10,411,540 Sterling ! of which upwards of one-half, being L. 5,394,033, was *surplus fund or profits* !! and this over and above the large surpluses already paid on account of the great number of members who have died.

cease of any of the persons assured prior to 1st January, 1820*.

These two societies have been mentioned, because they both commenced without any subscribed capital, and were established upon the same principles of mutual assurance as the one now proposed to be instituted. They had the merit of successfully shewing how Life Assurance Associations could be established and conducted, upon a large scale, by the assured members themselves, without any capital subscribed by a separate class of proprietors; but they now inconsistently enough wish it to be believed, that innumerable dangers and difficulties must attend the infancy of any new institution which may attempt to pursue the same course. Nor indeed will this appear surprising, upon considering how natural it is for all to favour even any mercantile concern with which they may have become connected, and to oppose the establishment of any other, by which the imperfections of their own may become apparent, or their pecuniary interests be made to suffer. But much more must this feeling operate in the case of Life Assurance Societies; for, during a long period, they have been groping in the dark,—their schemes are still clogged with much of the expensive and awkward

* “The tables of mortality, from which the rates of premium charged by Assurance Institutions are calculated, are founded on observations made upon large communities, taken collectively, and just as they are found; and, therefore, in deducing from such data the value of human life, the result must be considered as representing merely an *average*. But in Life Assurance Offices, fenced round as they are against the admission of all unhealthy and infirm persons, it is *SELECT* life alone with which they have to do; and, therefore, with them the operation of the law of mortality, as exhibited in large communities, is very sensibly retarded. The rate of interest, too, assumed in their calculations, is considerably below that at which, with the favourable opportunities for investment generally enjoyed by these bodies, the accumulated capital may be improved. These, together with other causes more incidental in their nature, such as the surrender and forfeiture of policies, constitute the sources of the Surplus Fund,—being the balance arising in favour of the institution, after defraying the claims which have actually emerged by the failure of assured lives, and the expenses of management, and setting apart the full value of all existing assurances, ascertained by accurate computation.”—*Explanation and Use of the Table of Rates of the Scottish Widows' Fund and Life Assurance Society*, 1829-30.

machinery incident to the earlier stages of their existence,—extensive capital has been sunk in them,—and large sums have been paid away, and still larger promised, to the original members, upon expectations which can never be realized. A continuance of the old high rates of premiums, and a geometrical increase of members, have been calculated upon; but, in the now improved state of the science, it is impossible that the defects of the present systems can long be concealed, and consequently neither these rates nor the specious promises of future returns for the over-payments, will be much longer tolerated by the public. It will be found by the constituent members, that large sums had been prematurely promised and paid away in the shape of bonuses, to those who had little or no right to them, and that those from whose payments these bonuses had arisen, were left to seek their relief from a source now cut off by the more recently and better constituted societies. Neither will it be easy, if at all practicable, for Mutual Life Assurance Associations of any standing, after such sums have been paid away, either to lower their premiums, or otherwise adjust their schemes, to the satisfaction, and with a due regard to the various conflicting interests, of the old and new members; and which circumstance of itself fully accounts for this class of associations still adhering to their high rates, while those of even the greater number of the proprietary companies have lately been reduced. Hence the truth of Mr Babbage's remark, that “if tables not representing the mortality of the class for whom they are designed are employed,”—“the errors so introduced may not improbably act on the opposite side to that which they were intended to favour.” And hence also the reason for the jealousy which exists, and all the objections which have been urged, against the success or stability of any new Life Assurance Society; but to perceive the utter fallacy of such objections, a very brief analysis of them will suffice.

IV. *Objections to newly instituted Life Assurance Societies refuted.*

First, then, it has been affirmed that the field for Life Assurance Associations is now completely occupied, and therefore that, as great difficulty was experienced in obtaining members even during the earlier periods of the older established institutions, when the number of these was more limited, this obstacle must operate to a far greater extent against any society which may be attempted to be instituted at the present time. But nothing is more easy than to shew the futility of such reasoning. Previous to the last sixteen years, the country had been long involved in war, and the attention of the public was consequently directed to objects very different from those of Life Assurance. Its principles and operations were almost totally unknown to even the higher classes, and it was only after peace had been established, and time had been allowed them for attending to matters at home, that the advantages of this method of providing for families, dependents, and creditors, began to be apparent. The progress of this knowledge, however, was at first extremely slow : it was chiefly confined to the members of the more learned professions, and was through them communicated to those in the higher ranks of life. Accordingly, it was only about the year 1820 that this latter class of the community could, in this quarter of the kingdom at least, be generally induced to countenance Life Assurance Associations ; and, as has been already seen, it was only since then that the fundamental principles of the science have been elucidated both by public and private investigations, and that these institutions have but now been enabled to be established upon safe and equitable bases. Hence from all these circumstances arose the difficulties which occurred at the commencement of former societies, but these difficulties no longer exist. Not only by the higher ranks, but also by the middle and working classes, the principles and great utility of Life Assurance are beginning to be fully

understood, and the great mass of the intelligent and industrious portion of the community will speedily take advantage of its benefits, not only with the view of providing for their families, or other relations, in case of death, but likewise of facilitating the ordinary business transactions of life *. So far, therefore, from the field for Life Assurance being already sufficiently occupied, it is evident that the ground has been but partially broken for experiment, and that ample room and a rich harvest yet remain for those who, avoiding former errors, will cultivate it upon improved and scientific principles.

Another objection which, as partly already noticed, has always been stated to the system of Mutual Assurance, is, that, owing to the want of capital, there is little or no security to the members for payment of the sums assured, during a long period after the commencement of any such institution. This at first sight appears a very strong and feasible objection, and it has been accordingly urged upon the notice of the public by every means that the Proprietary and older established Mutual Assurance Associations could command. The truth however is, that the very principles of Life Assurance effectually prevent, even under the most ordinary management, the chance of a deficiency of capital at the commencement. It must be par-

* "In this description are comprehended a great part of the clerical profession, civil officers and clerks holding situations under Government, annuitants in general, and that very numerous class of naval and military officers, of whom a large proportion can barely subsist on their pay, and who must continually and painfully be reminded, that the pension to which their widows are entitled, liberal as it must be considered on the part of the public that bestows it, is far from being adequate to the decent maintenance of a family. To these may be added, the greater number of professional men, as lawyers, physicians, surgeons, &c. who may happen to marry and have families, while only in moderate practice; as also, merchants, bankers, shop-keepers, and various tradesmen under the same circumstances, who may not have the means of leaving a provision for their families or near connexions, in the event of premature death. To all these the various institutions for the assurance of lives hold out relief, available for the most part by all such as are able and willing to resort to them; and the truth is, that even the very highest ranks of society have now frequent recourse to them, in order to make a provision for the younger children where the family estate is entailed."—*Quarterly Review*, January 1827.

ticularly kept in mind, that, quite contrary to what prevails in common mercantile concerns, the income of a Life Assurance Society must uniformly *precede* the expenditure, and there can never be any loss from bad debts; and moreover, that not only must the income precede, but in every probability be at least double, the expenditure for a great number of years. The accuracy of these statements will at once be evident by merely referring to the Table of Premiums,—by recollecting that these are always paid in advance,—and by ascertaining the utmost probable claims that can annually come against the institution. Let a view of a society in its simplest form be thus taken.

It is to be observed, in the first place, that the requisite premium, as deduced by Mr Babbage from the Equitable Society's experience, from a person aged 20, for L. 100 at death, is only L. 1 : 9 : 6, while by the annexed table it is L. 1 : 15 : 8, or an excess of L. 3 : 1 : 8 per L. 1000, which certainly shows that the latter rates are sufficiently high for every proper purpose. In the next place, instead of the age of 20, as in Mr Babbage's example, if we suppose a society, at the end of the first year, to consist of persons at the average age of 35, the annual mortality at that age is not quite so much as 1 in 97, and if they join in equal numbers during the former and latter half of the year, the society has every chance in its favour of none dying during the first year, more especially as all must have been in good health at entry. But even supposing one to die, it is more than probable that, for the reasons just stated, the event would happen in the last half of the year; and as six months are always stipulated to elapse after death before payment of the sum assured can be demanded, it consequently follows that the second year's premiums would have first become payable, which, for the remaining 96 members, would, for an assurance of L. 100 each, amount to L. 224, 9s.; and this being added to the former year's premiums, would amount, exclusive of interest, to L. 451 : 4 : 9.

Here, then, is a sufficient sum previously provided, not only for the calculated death of one, but of nearly five members ; and is it reasonable to suppose that, under all the circumstances, and in so short a period, such a frightful mortality would occur ? But if, contrary to all probability, an extra number of deaths should happen during the first year, there would be every likelihood that the greater part of the defective lives had perished, and it would be very improbable that the second year would produce the average number of deaths, or indeed any at all, after which the capital would of necessity be always more than sufficient for meeting every claim. It will also be obvious, that the same mode of computation will apply, whether the sums assured be L. 100, L. 300, or L. 500, as the premiums will be increased in proportion ; and hence no danger can arise from these higher assurances, provided care be taken that the number of the highest individual risks at first be in proportion to the ages and total number of the members. In short, it is an obvious and inherent principle of Life Assurance, that a large accumulation of capital must of necessity always take place from the very commencement of any institution, for the aggregate premiums are then at least double the calculated expenditure—the lives are all select—the most of the members are young, and but few of them more than middle-aged. It will thus be seen, that it is next to impossible for any Life Assurance Society, with the least degree of prudent management, to meet with difficulties at the beginning ; and consequently, all the dangers which have been urged, and all the fears that have been entertained, upon this subject, have been proved, by uniform experience, to be wholly destitute of foundation.

But it has been farther erroneously said, that the high premiums required by Mutual Assurance Associations afforded a guarantee-fund for early deaths, and that, if the surplus were not required, it was periodically returned to the members, by being added to the original sums assured, in the way already alluded to. The first of these assertions, however,

cannot be consistent with the fact, for it will be evident that, great as the excess of premiums is by their tables, more especially when paid and accumulated with interest for a long series of years, such excess would of itself go but a very short way in liquidating any demands at first; and with regard to the *bonuses*, or *good things* as they have been termed, it has been formerly shown, that, however good they may be for a few individuals, they are in reality extremely bad things for the great majority of the assured. They sooner or later become serious bones of contention between the old and young members, and even seldom, under the present system, can two actuaries be found to agree as to the proper mode of division *. As might have been anticipated, however, the interests of the younger classes have generally been sacrificed, sufficient examples of which are afforded by the plan some time ago adopted by the Equitable Society of London, and which plan has also been very recently followed, and even to a greater extent, by a new institution in this quarter of the

* From the way in which *bonuses* are always talked of, it would lead to the supposition that their distribution is a matter of such obvious facility and equity, that no doubt or difficulty can exist as to the proper mode of apportioning them; but that the very reverse is the case, will appear by the following extract from a Report by a Committee of the Law Life Assurance Society in 1823. "Your committee, in pursuance of the directions of the last general meeting, have taken into consideration that part of the 35th rule, which relates to the mode of distributing, among the respective policies, that portion of the profit which is to be assigned to the assured; and they have submitted to Mr Morgan of the Equitable Office, to Mr Milne of the Sun Assurance Office, both of whom have written treatises on the subject of Life Assurance, (and the latter of whom is an actuary in an office where no division of profit is made among the assured, and who is therefore not pledged to any particular mode), as well as to three gentlemen who have announced their intention of becoming candidates for the office of Actuary to this Society, a case, for the purpose of ascertaining what is the correct mode of distributing the profit among the assured; and if the correct mode be impossible or too difficult to be used in practice, what would be the most just mode that could practically be adopted? Your committee have to state, that all the gentlemen consulted concurred in opinion upon two points: 1st, That the mode proposed in the 35th regulation is incorrect, and unfit to be adopted; and, 2d, That the mode adopted in the Equitable Office is not the correct mode. But upon the three following points, viz. What is the correct mode of distributing profits? Whether the correct mode be the practicable mode? And what would be the expedient mode for the Society to adopt?—they all differ in opinion."

kingdom *. But a similar system has hitherto more or less prevailed in even the best regulated associations—no member being entitled to any return for his extra premiums until five, seven, or ten years after entry, during the currency of which period it was, owing to the lives being then at their best, that the greatest profit accrued from their contributions; while, again, the original members continued to reap the greater benefit the farther they advanced in age, at the same time that their payments were becoming annually of less value to the institution. Hence, as already remarked, under the first head of these observations, p. 142-3, and for the reasons there given, the first class of original members gained at the expense of the second; the first and second at the expense of the third; the first, second, and third at that of the fourth, and so on—the surpluses accruing to the last or youngest class of entrants being always diminished in proportion to the number and ages of those who had entered before them. It is on this account that so great an anxiety is always evinced by institutions of this kind for a large accession of new members upon the approach of a periodical investigation, for without a greatly increased ratio of these between every such period, the bonuses would speedily decrease, and, ere long, disappear altogether †.

* Previous to 1816, all the members of the former society, after paying six annual premiums, were entitled to participate of the surplus; but it was then declared, that in future the first 5000 policies on the list should alone be entitled to it; and in 1824, the number of the excluded amounted to about 4000, more than one-half of whom could never from this source receive any benefit; but the founders of the latter institution have even gone a great deal farther, for they have not hesitated to announce to the public that persons insuring with them “*during the first year, will be placed on the most favourable footing, as the profits at the first investigation will fall to be apportioned amongst the old members only, and according to the dates of their respective policies, which will secure an important advantage to them.*”

† In confirmation of these remarks, it may be enough to refer to a paper by Mr Patrick Cockburn, submitted in 1824 to the Directors of the Scottish Widows' Fund and Life Assurance Society, to which institution he is Accountant and Auditor.

“*2dly, It is evident that it is from this source chiefly, i. e. the excess of the calculated above the actual rate of mortality in the Society, that the surplus fund from which the addition to the benefits which are expected*

The plan of division usually adopted, is also liable to much objection, for the bonus is merely proportioned to the sum assured, and to the number of annual contributions made since the preceding period of investigation, but without any regard to the ages. Hence, supposing the standing and circumstances of two members, the one aged 30, and the other 60, to be such as to entitle each to a bonus of 25 per cent, it is evident that, as this bonus is only to be paid at death, the present value of it would be worth almost twice as much to the older member that it would be worth to the younger. Thus, suppose the member aged 30 to be insured for L. 400, a bonus of 25 per cent. would add another L. 100 to his policy. Now, if he were to have made a single payment for this additional sum, it would have only cost him, by our table, L. 36, 4s.; whereas, were the member aged 60 to have paid in the same way for his additional L. 100, it would, by the same table, have cost him L. 64 : 12 : 10;—and if the difference is so great upon hundreds, what must it not amount to upon thousands?

must arise. *3dly*, It will be observed that this excess *diminishes*, and the *actual number approximates to the calculated number of deaths, as the age advances*.—It is principally to this last fact, and the circumstances which give rise to it, that the writer of these remarks is desirous of calling the attention of the Directors. It has already been observed, that the reason why the expectation of life is so much higher in an Assurance Society than in the community at large is, that the former is composed of persons selected as being in good health and sound constitutions at the time of entry, whereas the latter consists of persons of all descriptions, many of whom have contracted diseases which tend to shorten their lives. Now, it is obvious that this cause, which has a tendency to raise the expectation of life of an Assurance Society above the ordinary rate at all times, must operate in a far greater degree at the commencement of the Society, when it consists entirely of *new members*, than in its more advanced stages, when it consists partly of the class of new members, and partly of the various classes of *old members* who may have been for some time in the Society, and may have contracted diseases, and whose expectations of life must consequently approximate to the general expectation of life in the community, as shewn by the Northampton Table. In short, the writer of these remarks has no hesitation in affirming, from the calculations that he has made, founded upon the occurrences in the Equitable Society, that he believes the deviations of the actual rate of mortality in that Society, from the rate as exhibited in the Northampton Table, is confined chiefly, if not wholly, to the *first ten years after the entry of the members*; and that, after that period, the rate of mortality in the Society, if the observations were confined to each successive class, without mixing it with new entrants, would be found to correspond pretty nearly, if not wholly, with the calculated rate."

Here, then, the old members have again nearly a double advantage over the young, even after their probationary period for the said bonus has expired; and this, too, be it observed, at the same time that little or no surplus can be arising from the premiums of the former class, owing to their mortality now keeping pace with the calculated rate; while, for the reverse reason, the fund of division is chiefly arising from the payments of the latter or younger class.

Such being the defects of the Systems of Life Assurance, as at present conducted by even the Mutual Guarantee Associations, it is wholly unnecessary to allude to the still more formidable objections which are applicable to the other two classes of Mixed and Proprietary Copartneries. In the one of these the greater portion, and in the other the whole, of the surplus or profits is periodically swept off by those called Proprietors, on account of their pretended obligations to the assured, but which had never any existence, for the plain reason that implement of them could never be required *.

* "Some of the Mixed Associations engage to give the assured two-thirds, and others four-fifths of the profits. But no matter what the promised proportion may be, the same unjust principle of division is invariably adopted. For example, suppose an office thus constituted to take a premium of L. 90, when the actual risk of life would require only L. 60 (and there is no proprietary office which on an average takes less), the assured would thus have paid L. 30 too much. Let it be farther supposed that the party's age is 27, and that the office professes to return him two-thirds. On a fair division, he would be entitled to L. 20, and the proprietors to L. 10. But instead of acting up to this profession, of giving him L. 20, they would add that sum to his policy; and L. 20 payable at the death of a man aged 27, being only of the value of L. 6 in present money, the assured would get but one-fifth of the excess which he had himself contributed; whilst the proprietor, who professes to take only one-third, adds L. 10 in money to his capital, and at the next division takes another slice off the accumulating ball;—thus receiving nearly as much again as he gives to the assured, who, at the time he effects his insurance, is led to believe that he is to have twice as much as the proprietor. The folly of looking to subscribed capital, as a reason for paying excessive premiums, can never be more clearly illustrated than by such a division of profit; as the prejudiced assurer contributes more than is necessary to form a fund for the payment of his policy, and thinks himself liberally rewarded by a return of one-fifth of the excess of his own contribution. *That a subscribed capital is totally unnecessary, experience in matters of assurance clearly proves*; and that such a capital, so far from affording an additional security to the assured, diminishes to a most dangerous extent that which they have themselves provided, can easily be made out. For, strange as it may at first sight appear, it is nevertheless strictly true,

To persons, therefore, about to enter into the very important transaction of insurance on their lives, it becomes a matter for very serious consideration, if they should still submit to the heavy premiums required by the already existing companies, and to all the disadvantages incident to their schemes. Several individuals have already resolved to form themselves into an association for Mutual Life Assurance upon scientific and more equitable principles. The annexed Tables, which are to be used by them, have been calculated from the law of mortality obtained by Mr Finlaison (and adopted in the Government Tables), and 4 per cent. interest, with an addition of 10 per cent. to the premiums for males, and 15 per cent. to those for females. These tables have been calculated with the greatest care, and the rates are considered, by very competent judges, to be sufficiently high for all the ordinary purposes of Mutual Life Assurance. Upon a comparison with other rates of premium, it will be perceived, that, by the tables of some of the most popular institutions, the payment required from an applicant at the age of 30, for L.100 at death, is L.2:11:1 per annum; whereas, by the tables in question, even for a male, it is only L.2:1:6. Hence the difference of premium for L.1000 comes to L.4:15:10 annually, which would amount to no trifling sum during life, and is consequently not to be thrown away, or at best risked upon a contingent bonus for the benefit of posterity, and which bonus is not even to become payable at all, unless the

that the *larger* the amount of capital originally subscribed by proprietors, the *less* will be the *ultimate* security to the assured, and consequently the greater the danger of ultimate insolvency; as the premiums which otherwise would be accumulated at compound interest, as a security for the policy holders only, will at a period not very remote be reduced by a sum many times exceeding the subscribed capital. If, for instance, the capital be L.100,000. and the proprietors, for their supposed risk, take a remuneration equivalent to two per cent. per annum, the fund of premiums, from which alone such remuneration can be drawn, would in 50 years have suffered to the extent of L. 400,000, and in 100 years, if the proprietors take only *one* per cent., by the enormous sum of L. 2,600,000; the gain of which by the capitalists (beyond the interest made by their capital) is so much of loss and of diminution in security to the assured."—*See Treatise on Life Assurance by Mr George Farren, 1824.*

member survive for a considerable number of years after entry. Surely it is better either to save the difference altogether, or at once to add its value to the sum in the policy, which it will afford to increase by no less a sum than L.231, and which would be payable however soon thereafter the life might fail. Besides, there are numbers of individuals who find it expedient, from various circumstances, to insure their lives for a specific sum, until the occurrence of a certain event, or till the expiration of a certain period, after which the continuance of the insurance becomes altogether unnecessary. Such individuals are evidently compelled, by the bonus system, to pay for what they do not want, and, should they die or leave the institution early, for what their representatives can never receive. But to shew still farther the disadvantage of high premiums, let a person be supposed to have joined one of the institutions referred to at the age of 30, for L.1000 at death, and to be now 35, he will still be paying L.25 : 10 : 10 ; whereas, were he at present to abandon it, and join a society founded upon the principles proposed, his premium for the same sum at death would be only L.23 : 7 : 6, and consequently the saving would be L.2 : 3 : 4 per annum during life. It would be tedious and unnecessary to follow the comparison farther, but it is not in the least to be doubted, that, unless a considerable reduction of premiums be soon made by the other institutions alluded to, not only will their future accession of entrants be very limited, but likewise not a few of their best and youngest members will be found at no distant period to have left them, and to have joined other institutions founded on more correct and equitable principles *.

* "The prevailing systems of assurance having been considered," says Mr Farren, "the result may fairly be said to be, that excessive premiums are charged in all cases with nearly equal justice. For to take exorbitant premiums out of the pockets of those who, by frugality and industry, seek to provide for their families, to enrich a proprietary body, for lending their names to guarantee a capital which can never be wanted, is neither liberal nor just; and the accumulation of excessive annual payments, merely to form an immense surplus fund, which, if ever divided, can only be for the benefit of a very remote posterity, bespeaks prejudice and credulity on one side, and at least a want of scientific arrangement on the other."

TABLE II.—*Shewing the Single and Annual Premiums for £100 at Death.*

FEMALES.													
AGE.		Single Payment.		Annual Premium.		AGE.		Single Payment.		Annual Premium.			
	£	s.	d.		£	s.	d.		£	s.	d.		
18	27	10	3	1	7	10	40	39	2	4	2	5	7
19	27	17	8	1	8	4	41	39	16	9	2	6	11
20	28	5	0	1	8	10	42	40	11	10	2	8	3
21	28	13	0	1	9	4	43	41	7	6	2	9	9
22	29	1	2	1	9	11	44	42	3	9	2	11	3
23	29	9	9	1	10	6	45	43	0	10	2	12	11
24	29	18	9	1	11	2	46	43	18	9	2	14	8
25	30	8	0	1	11	9	47	44	17	6	2	16	7
26	30	17	8	1	12	6	48	45	17	1	2	18	8
27	31	7	9	1	13	2	49	46	17	6	3	0	11
28	31	18	0	1	14	0	50	47	18	10	3	3	3
29	32	8	7	1	14	9	51	49	1	5	3	5	10
30	32	19	5	1	15	7	52	50	4	10	3	8	8
31	33	10	9	1	16	5	53	51	9	2	3	11	8
32	34	2	5	1	17	5	54	52	14	4	3	14	10
33	34	14	2	1	18	3	55	54	0	1	3	18	4
34	35	6	2	1	19	2	56	55	6	2	4	2	0
35	35	18	4	2	0	2	57	56	12	9	4	5	10
36	36	10	4	2	1	2	58	57	19	10	4	10	0
37	37	2	8	2	2	2	59	59	7	3	4	14	5
38	37	15	4	2	3	3	60	60	15	5	4	19	2
39	38	8	8	2	4	5							

EXAMPLE.

A Female aged 30, may secure L.100, payable six months after her death, whenever it may happen, either by a single payment of L.32, 19s. 5d., or by an annual premium during life of L.1:15:7.

ACCOUNT OF THE LARCH PLANTATIONS ON THE ESTATES OF
 ATHOLL AND DUNKELD, EXECUTED BY THE LATE JOHN,
 DUKE OF ATHOLL. *Drawn up from Papers and Documents, communicated by his Grace's Trustees to the Highland Society of Scotland.*

As the larch is a plant which grows naturally in elevated situations, among the central alpine ranges of the Continent of Europe, it were reasonable to expect that it should grow with vigour in any other alpine country, the mean temperature of which is not materially below that of its native site, and the mountains of which could afford due shelter from the influence of sea air. The same result, even before the actual experiment of transplanting the larch should have been attempted, might also reasonably be expected to be exhibited in any country, the climate of which is similar to that of the elevated part of the native country of that tree, whether the similarity should arise from an altitude above the level of the sea, or from a higher parallel of latitude. In this country the results of experience accord exactly with the expectations of reason. The larch in Great Britain has grown with vigour in all the mountainous districts in which it has been planted, and has acquired its greatest development in situations removed from the immediate influence of the sea air. Where it has exhibited itself in a diminutive state of growth, has been near the sea shore, and on soils quite unsuited to its nature. In such cases, the failure must be ascribed not to the nature of the materials experimented on, but to the misapplication of the tests employed. Enough, however, has already been achieved, by many individuals, in rearing the larch to perfection, to encourage many more to follow their example ; and thus create a great source of emolument to individuals, and of internal strength to the nation.

There is no name that stands so high, and so deservedly high, in the list of successful planters as that of the late John, Duke of Atholl. It is true few people possess the fortune and property which his Grace did; but how many are there who do possess them, and who “never think of these things;” and how many groups of mountain ranges are there in Britain, which rear their bare and sterile sides to the strife of the elements, while those of Atholl are clothed with the beautiful and stately productions of the vegetable kingdom! The contemplation of this forest scenery excited a natural warmth in the breast of his Grace, and which he thus notes down in his memorandum-book: “Drove up to Loch Ordie, and home by the back of Craig-y-barns, every way much gratified with the growth of the larch and the spruce,—a very fine, grand, picturesque drive, not to be equalled in Britain! The extent of the drive through woods of my own planting, from one to forty years old, is fifteen miles.” Were even the less improvable parts of smaller properties clothed with a forest-mantle of larch, they would develope in the course of time new sources of wealth to their proprietors, of greater value than the discovery of a diamond-mine, or of that other inflammable mineral which is said to be the remains of pre-existing forests. No language of exaggeration is required to indicate the probable value resulting from the planting of the larch. Sober calculation will work out products, surprising to those who have never thought of the subject.

The late Duke planted, in the last years of his life, 6500 Scotch acres of mountain-ground *solely with the larch*, which, in the course of seventy-two years from the time of planting, will be a forest of timber fit for the building of the largest class of ships in his Majesty’s navy. It will have been thinned out to about 400 trees per acre. Each tree will contain at the least 50 cubic feet, or one load of timber, which, at the low price of one shilling per cubic foot, only one-half of its present value, will give L. 1000 per acre, or in all a sum of

L. 6,500,000 Sterling. Besides this, there will have been a return of L. 7 per acre from the thinnings, after deducting all expense of thinning, and the original outlay of planting. Further still, the *land* on which the larch is planted is not worth above 9d. to 1s. per acre. After the thinnings of the first thirty years, the larch will make it worth at least 10s. an acre, by the improvement of the pasturage, upon which cattle can be kept summer and winter.

The Duke remarked, in 1815, before he had commenced planting his great larch forests, in anticipation certainly, but not in ungrounded expectation, that "if one-fourth part of the product of 2,600,000 larches arrive to maturity in seventy-two years, by the time the present century expires, it will supply all the demands required by Great Britain for war or commerce. The success which has attended my efforts will probably induce, and indeed has induced, many already to plant to an extent which will not only meet the wants of Great Britain, but enable her, possibly within a century, to export wood to an immense amount. Under these circumstances, the prices of wood for ship-building may, and probably will be, much decreased at the same time. The grounds I have planted and intend to plant, I consider admirably calculated to produce the *best wood*; and I think too, that my plantations will be the first in the market for a number of years, to any considerable extent; and, lastly, the greater quantity, though of less price, will make up and probably be productive of an income to a much greater amount than that of any subject in the kingdom. The price of larch-wood will, no doubt, always be regulated according to the demand; but I have no hesitation in saying, that the price, when the wood is thoroughly known, will long continue superior to the best foreign fir-timber, and little inferior to the oak."

Such being the splendid prospects arising from the exertions of one man, it would be interesting to ascertain the *means* by which similar results might be obtained; and, for-

tunately for future inquirers, the late Duke himself has left documents, the accuracy of which is attested by his own hand, and from which a satisfactory account of his whole proceedings in planting, with all their practical details, can be drawn up. More light was thrown upon the planting and management of larch-forests, by the late Duke, than it ever fell to the lot of one man to divulge. It is the object of this paper to give an accurate, and at the same time a succinct account, of his proceedings in regard to the treatment of the larch. The facts and details connected with the subject in all its bearings are very numerous, and it is impossible to render the subject intelligible to the inquiring planter, without the introduction of details; but their results all tending to the great principle of utility, cannot fail to attract the attention of every reader who feels an interest in his country's improvement and welfare.

The Larch is mentioned by Parkinson in his *Paradisus* so early as the year 1629; but it was then "nursed up but with a few, and those lovers of rarities." Evelyn, in the later editions of his *Silva*, published at the close of the 17th century, alludes to specimens of the larch tree then existing near Chelmsford in Essex "of good stature," which "sufficiently reproach our not cultivating so useful" a species of tree. For many years after this, larch continued to be cultivated merely for curiosity, or as an ornamental tree. Till towards the middle of the 18th century, no one appears to have thought of planting it with the view of profit, or to have regarded it as calculated to afford timber for the purpose of civil and naval architecture. The Rev. M. Harte, who wrote about 1770, mentions that "forty years ago (*i. e.* about 1730) some larch trees in England were bearing cones every season." Goodwood, the property of the Duke of Richmond, was probably the first place at which it was planted as a forest tree, and even there it was only in small numbers.

There is much greater certainty regarding its introduction

into Scotland in 1738. In that year, Mr Menzies of Megeny, in Glenlyon, brought a few small plants of it in his portmantau from London, five of which he left at Dunkeld, and eleven at Blair in Atholl, for Duke James, the grandfather of the late John, Duke of Atholl. The five were planted in the lawn at Dunkeld, in an alluvial gravelly soil abounding with rounded stones, and in a sheltered situation at an elevation of 40 feet above the River Tay, and 130 feet above the level of the sea. Two of the five were felled by the late Duke in 1809, and one had been cut, by mistake, by the gardener about twenty years before, and made into mill-axles. Of the two felled in 1809, one, containing 147 cubic feet of wood, was sent to Woolwich Dockyard, and formed into beams for the repair of the *Serapis* store-ship. The other, containing 168 cubic feet, was bought on the spot by Messrs Symes and Company, ship-builders, Leith, at 3s. per foot, or L. 25, 4s. the tree. The two which remain are still growing in great vigour. The one is above 11 feet, the other above 12 feet in girth, at four feet from the ground; and the largest, according to a measurement made by a professional gentleman in the summer of 1831, contains 350 feet of timber. The eleven which were planted at Blair, at an elevation of 500 feet above the level of the sea, measured in 1817 from 8 to 12 feet in girth. The interest which attends the fate of that which is first introduced in any useful branch of industry, in any country, will gladly treasure up these facts regarding the oldest and largest larches in Scotland as important.

In 1740, six larch plants were brought up in the greenhouse at Dunkeld, and not appearing to thrive in it, they were planted out, three on each side of the greenhouse. They had evidently suffered from the warmth of the house, and though they are now fine trees of seven feet in girth, and are ninety years of age, they are much smaller than many larches that were planted after them. It is not mentioned whether they

had been raised from the seed. As five had been planted in the open air two years before, and must have been thriving, it is difficult to account for their being put into the greenhouse, except on the supposition that they had been raised from the seed.

Between 1740 and 1750, Duke James planted 350 larches at Dunkeld, at an elevation of 180 feet above the level of the sea, and 873 at Blair, among limestone gravel, in a sheltered situation, which was worth from 20s. to 30s. per acre, at an elevation above the sea not exceeding 560 feet. All these larches were planted in the ornamental ground around Dunkeld House and Atholl House, the two residences of his Grace. So situated, and in regular rows wide apart, they were evidently intended more as a trial of a new species of tree, than for forest timber. But, in 1759, Duke James planted 700 larches, over a space of 29 Scotch acres, intermixed with other kinds of forest trees, with the view of trying the value of the larch as a forest tree. This plantation extended up the face of a hill from 200 to 400 feet above the level of the sea. The rocky ground of which it was composed was not worth above L. 3 a-year altogether. It was covered with loose and crumbling masses of mica-slate. This may be considered the first attempt at mountain planting in Scotland. According to the fashion of the time, the trees were arranged in rows, and they converged towards a small piece of water in the centre like radii. This concluded the whole attempts at planting by Duke James. Before he died, however, in January 1764, he had tried the quality of the larch as timber, and was quite satisfied of its superiority over other firs, even in trees of only eighteen or nineteen years old.

To show how well this planting thrived, a larch was cut out of it by the late Duke in 1816, aged fifty-seven years, for naval purposes, which contained 74 cubic feet of timber, and was sold, exclusive of all expense, at 2s. 6d. per foot, or L. 9, 5s. the tree. "I don't believe," says the late Duke, in speaking

of this very plantation, "there is another species of tree in the 29 acres, oak included, except a few spruces, that would bring a guinea. Some of the spruces might contain from 30 to 40 feet, and be worth 2s. a foot."

Duke John, father to the late Duke, succeeded his father in 1764. It was he who first conceived the idea of planting larch by itself as a forest tree, and of planting the sides of the hills about Dunkeld. The former of these ideas was put into execution in 1768, by the planting of 3 acres with larches alone on Craigvinian, above the wood which Duke James planted on the same hill in 1759, at an altitude of from 100 to 200 feet above it, or 500 or 600 feet above the level of the sea, on soil that was not worth 1s. per acre. The latter idea of Duke John was effected by the inclosing of a considerable extent of ground for the planting of mixed wood, as 190 acres on Craig-y-barns, 30 acres at Callie, 30 acres at Haughend, 90 acres on Craigvinian, 25 acres of the Hermitage plantation, and several small clumps, including in all 5 or 6 acres, all at Dunkeld, and near 300 acres at Blair, forming a total of 665 acres. Of these he finished the planting of 410 acres before his death in 1774.

The greatest obstacle to the progress of the Duke John's planting was the scarcity, and consequent dearness, of the larch plants. He had raised a few plants himself from the cones gathered from some trees at Blair, which began to bear fruit at the commencement of his operations; but this supply did not exceed 1000 plants in a season. At the same time, three and four years transplanted larch was selling in the nursery grounds as high as 6d. per plant. All that could therefore be obtained for planting did not exceed fifty plants per acre in the large plantations; and the rest of the quantity, amounting to 4000 plants per Scotch acre, that being the allowance of plants to the acre at that time, were made of the Scotch fir and the different kinds of hard wood. The larch was planted at a height not exceeding 600 feet, and the Scotch

fir at 900 feet above the level of the sea. Another difficulty which the Duke John had to encounter was from the broom, furze, juniper, and heath, which flourished abundantly in the region allotted to the larch, and which had not been entirely eradicated before the planting began. The broom, though indicative of a good soil for larch, is a troublesome plant to young trees, its long switch-like elastic twigs whipping their tops violently in windy weather. The furze with its thick set spiny branches smothers or draws up prematurely the young trees. These and many other obstacles would no doubt have been removed by the Duke John, had he had leisure to attend to planting only; but having been obliged to be frequently in London regarding his title, and the affairs of the Isle of Man, his attention was otherwise occupied for the greater part of the short time which he enjoyed his property.

Such were the state and extent of the larch plantations at Dunkeld and Blair when the late Duke succeeded his father in 1774.

As the facts and details connected with the late Duke's system of planting are very numerous, the subject will be better understood if divided into heads. It is, therefore, proposed, *first*, to describe *the treatment of larch forests* from their planting to the period at which the timber is cut for use, with every subsidiary circumstance connected with it; *secondly*, to state the *value* of the larch as a tree and as timber, and the various uses to which it may be applied; and, *thirdly*, to relate some instances of the *strength* and *durability* of the larch, in comparison with other kinds of wood.

The first object of the late Duke was to plant the 225 acres which formed a part of the plantations that were left unfinished by his father at his death in 1774. This, with some larches planted about the Loch of the Lows, occupied him so long as the year 1783. This delay was owing to the difficulty of obtaining larch plants, all the number that could be obtained during that time amounting only to 279,000.

Observing the rapid growth and hardy nature of the larch-tree, the Duke determined on extending the sphere of its occupation to the steep acclivities of mountains of greater altitude than any that had yet been tried. Hitherto the larch had chiefly been planted along with other trees. But the Duke inclosed a space, including 29 acres, on the rugged summit of Craig-y-barns, and planted a stripe, consisting entirely of larch, among the crevices and hollows of the rocks where the least soil could be found. At this elevation none of the larger kinds of natural plants grew, so that the ground required no previous preparation of clearing. After 1774, larch plants fell in price from 6d. a plant to 35s. per thousand, two and three years transplanted, and ranging from 2 to 3½ feet in height. The expense of inclosing and planting at this time was the same as in the time of Duke John, namely, L. 1 : 19 : 1½ per acre. This alpine plantation was formed in 1785 and 1786.

From 1786 to 1791, the Duke planted 480 acres at Dunkeld, the greater part of which was only sprinkled with larch from 6 feet to 30 feet asunder, owing to the difficulty of procuring a sufficient number of plants; and 200 acres at Blair, which were planted wholly of larch, at 6 feet apart. The number of larch plants consumed in these plantations in the five years was 500,000. Wages rising at this period, and there being a greater substitution of larch for Scotch fir, the expense of planting was considerably increased. That, with the inclosing, amounted to L. 2 : 10 : 6 per acre. The pitting alone cost 10s. 6d. per acre.

In the eight years from 1791 to 1799, the Duke still continued to diminish the number of Scotch fir, and to increase that of the larch. In this time the banks of the Bruar Water, extending to 70 Scotch acres around the beautiful waterfall, were planted. It is not unlikely that the humble petition of Bruar Water,

“To shade its banks wi’ towering trees
And bonnie spreading bushes,”

so well expressed in the words of the poet, might have had the effect of drawing his Grace's attention the sooner to the embellishment of this delightful spot. At Logierait, Inver, and Dunkeld, the space altogether planted extended to 800 acres, 600 of which were entirely of larch, but only planted so thick, from a paucity of plants, as merely to leave, after a scanty thinning, a sufficient number of trees for naval purposes. The Duke's desire to extend his plantations solely with the larch, in elevated situations, had to struggle very severely and painfully against the scarcity of plants that prevailed in the country, even at this period, when the value of the larch tree was begun to be appreciated. The expense of planting this piece of ground was the same as the last, and the number of larch plants consumed in it only amounted to 800,000, and even this number was obtained with great difficulty.

Still observing with satisfaction and admiration the luxuriant growth of the larch in all situations, and its hardihood even in the most exposed regions, the Duke still farther resolved on pushing entire larch plantations to the summits of the highest hills. The Scotch fir, that was planted at 900 feet above the sea, was beet up ten years afterwards by the late Duke with larch, as an experiment. In 1800, when the Duke was anxious still farther to extend his larch plantations, the effect of this experiment confirmed him in an opinion, which he had previously conceived, of the very hardy nature of the larch plant. These Scotch firs, in a period of near forty years, had only attained a height of five or six feet,—while the larch, which had been planted ten years after among them, were from forty to fifty feet. Nine hundred feet was an elevation at which larch was supposed incapable of vegetating. A favourable circumstance, too, occurred in 1800, which concurred with the result of the above experiment to give an impulse to the commencement of a great undertaking in planting. In that year several of the farms at Dunkeld fell

out of lease, and as they were all in miserable condition, his Grace took them into his own hand, to improve them, and to build suitable farm-houses and offices on them. This circumstance gave the Duke the command of a range of mountains, extending from the edge of Craig-y-barns, over a space of ground of 1600 Scotch acres. This space included a common, the rights of which the Duke bought up. It formed the back ground to the farms which the Duke had taken into his own hands. It was situate from 900 to 1200 feet above the level of the sea. Its soil, presenting the most barren aspect, was strewed over thickly with fragments of rocks, and vegetation of any kind scarcely existed upon it. "To endeavour to grow ship-timber," remarks his Lordship, "among rocks and shivered fragments of schist, such as I have described, would have appeared to a stranger extreme folly, and money thrown away. But, in the year 1800, I had for more than twenty-five years so watched and admired the hardihood and the strong vegetative powers of the larch, in many situations as barren and as rugged as any part of this range, though not so elevated, as quite satisfied me that I ought, having so fair an opportunity, to seize it."

During the same period in which the Duke planted the above mountain range, he also planted 400 acres in other situations—150 acres at Haughend, and 259 acres about the Loch of the Lows. These make a total of 2409 Scotch acres, 1800 of which consisted solely of larch, and 300 acres of this latter amount occupied a region far above the growth of the Scotch fir. These plantations, in inclosing and planting, occupied the long period of years from 1800 to 1815. This delay arose greatly from the difficulty of obtaining larch plants, and which only permitted them to be planted to a thickness of from 1500 to 1800 per acre. From a different mode of planting being adopted, however, and the selection of plants of an earlier age, an account of both of which will

be afterwards given, the cost of fencing and planting this extensive range of ground did not exceed 10s. 6d. per acre.

Having now no doubt whatever of the successful growth of the larch in very high situations, the Duke still farther pursued his object of covering *all* his mountainous regions with that valuable wood. Accordingly, a space to the northward of the one last described, containing 2959 Scotch acres, was immediately inclosed, and planted entirely with larch. This tract, lying generally above the region of broom, furze, juniper and long heath, required no artificial clearing. An improved mode of planting was employed here, that of using young plants only, two or three years seedlings, and put into the ground by means of an instrument invented by the Duke, instead of the common spade. This change of arrangement facilitated the operation, and, at the same time, greatly increased the supply of the plants, so as to enable the whole ground to be planted in three years, from the 4th December 1815 to the 2d December 1818. The increased number of plants per acre, and the high price of the plants, enhanced the cost to 16s. 8d. per acre, for inclosing and planting this forest of Loch Ordie, so named from a beautiful sheet of water in it, of 100 acres extent.

In 1824, the growth of the larch in Loch Ordie forest, having greatly exceeded the most sanguine hopes and expectations of the Duke, he determined on adding to it an extensive adjoining tract, consisting of 2231 Scotch acres, denominated Loch Hoishnie. The preparations of fencing, clearing where that was necessary, making roads, and procuring plants from different nurserymen, occupied the time till October 1825, when the planting commenced, and was carried on in good earnest; and the whole was finished by December 1826. The fencing and planting cost 15s. per acre. There was no plantation which his Grace had executed that gave him so much satisfaction in the work as that of the forest of Loch Hoishnie.

The planting of this forest appears to have terminated the labours of the Duke in planting; though it is highly probable, from his great desire to extend his larch woods, and particularly from the following entry in his private diary, that he intended still farther to prosecute them:—"Wednesday, 28th July 1824.—Mr Urquhart, the nurseryman at Dundee, went up to Loch Ordie with me. He is to furnish 50,000 one-year-old transplanted larch, and 1,000,000 of seedlings, 500,000 of which he engages to transplant, and to be ready to put into the ground in the autumn of 1825, and to deliver the remainder as seedlings. These, with 100,000 transplanted seedlings, to be furnished by Donaldson at Dunkeld, and 500,000 more in autumn 1825, with what I shall try and collect otherwise, will make a good beginning in my new forest of 6000 acres."

The following table will shew at a glance the extent of the larch plantations executed by the different Noble Dukes, and which will form a summary of what has been stated above.

	No. Larches exclusive of the other plants mixed with them.	No. Larches planted with- out mixture.	Acres of entire Larches.
Duke James planted, at Dunkeld and Blair, in 1738,	16		
... .. to 1750,	350		
... .. to 1759,	1,575		
Duke John planted, at Dunkeld and Blair, from 1766 to 1774,	11,400		
The late Duke John, 1774 to 1783,	279,000		
... .. 1783 to 1786,		43,500	29
... .. 1786 to 1791,	20,000	480,000	450
... .. 1791 to 1799,	560,000	240,000	600
... .. 1800 to 1815,	250,000	2,250,000	1800
... .. 1816 to 1818,		5,922,000	2961
.. .. 1824 to 1826,		4,038,880	2231
	1,122,339	12,074,380	8071

The total amount of larch plants, mixed or unmixed with

other kinds, will thus amount to the enormous number of 14,096,719 plants; and, if we allow 2000 plants per acre for the amount that was mixed with other kinds of trees, these would occupy a space, if planted alone of larch, of 533 acres, so that the whole extent of ground occupied by larch, amounts to 8604 Scotch acres, or 10,324 acres imperial.

The experience acquired during a period of more than half a century, in forming all kinds of plantations, must have suggested to the Duke many improvements in the mode of planting trees in general, and particularly that of the larch, and the treatment of that wood during the progress of its growth. The result of that experience has introduced a simple, cheap, and efficacious mode of inserting larch plants into the ground. It has also determined the proper age of the plant at which it should be planted, so as it may acquire the greatest state of perfection at the earliest possible period. It has indicated the proper number of plants to be employed in planting an acre, both in low and high situations. It has proved, beyond dispute, the capability of the larch not only to vegetate, but to thrive luxuriantly, in elevations far beyond what were previously prescribed for its locality. And it has shown that larch timber may be judiciously employed in the construction of the largest class of vessels. All these propositions are discoveries by the late Duke of Atholl, and very important discoveries they are, even in a national point of view.

Duke James had little opportunity of introducing improvements in planting. The properties of the new tree, larch, were not so well known by him as to stimulate him to an extension of its culture. He followed the fashion of the day, of placing trees in parallel rows, in diverging rays from a centre, and in quincunces. Gusts of wind, having free access through these alleys, blew down many thousands of the Scotch firs, and broke down as many, their heavy heads, and superficial hold of the soil, rendering them unfit to resist the effects of a

strong gale. To Duke James, however, belongs the honour of having introduced the larch into the woods of Atholl; and the experiments which he made with it, limited as they must necessarily have been, convinced him that it was a valuable species of timber.

Duke John abolished the stiff style of planting, and introduced the broadcast system, as it may be termed. Whatever advantages the sowing of corn in rows may possess, the plan is not applicable to trees. Duke John not only attempted the planting of larch by themselves, but he conceived the grand idea of clothing all the beautifully diversified grounds around Dunkeld with wood; and with this laudable intention, ventured to place the larch in considerably elevated situations. He always judiciously inclosed the ground that was allotted to planting; but not having sufficiently cleared it of the larger growing natural shrubs, such as broom, furze, juniper, and long heath, they grew up and choked many of the larch plants. This destruction was the more easily effected, as the larch plants were inserted into pits, and were three or four years transplanted out of the seed-bed. Having been tall and not very strongly rooted, they could not contend with the natural plants, which shot up vigorously from the old roots.

It was reserved, however, for the late Duke to discover most of the important facts now known about the treatment of the larch. He pursued his father's plan of planting broadcast, and of extending the plantations up the acclivities of the mountains. The experiments, too, which he tried with some of the larch trees planted by Duke James, which in his time had acquired a considerable size, in respect to the durability of their wood, encouraged him to persevere in the cultivation of the larch. The late Duke carried on all his plans in planting systematically. This enabled him to detect any improvement on every new trial. Every new trial did, in fact, discover some improvement on the former, till the very

last plantation which he executed gave him greater satisfaction in the work than all the preceding.

Seeing the advantages of enclosing the ground before planting it, as practised by his father, in preserving the woods from the depredations of men and animals, he enclosed every piece of ground substantially with a high stone wall, dry built, for which there was abundance of excellent materials on the spot, before it was planted. Seeing also the disadvantages of allowing the wild shrubs to interfere with the growth of trees, he had them all previously removed by burning, pulling, and eradicating. These shrubs never grow to a troublesome height at an elevation exceeding 700 feet above the level of the sea. At lower levels most of them grow from 10 to 12 feet in height,—the juniper pushes out strongly, and even the heath attains to the height of upwards of two feet. Feeling, too, the inconvenience of being shut out from viewing the interior of a plantation,—as, for instance, in the case of a hollow planted with trees by Duke James, which he had not seen for years, and in which one night a hurricane blew down and broke many hundreds of Scotch firs, as if they had been hewn down by the hatchet, and which were removed with great difficulty,—he caused roads to be formed in every convenient direction through the grounds which were to be planted. These roads were not metalled, as may be supposed, like a Macadamized one, but they were made quite accessible to wheel-carriages, by the filling up of hollows, and the levelling of elevations,—by making a ditch on each side of them, and sufficient openings across the hollows, to let off the superfluous water,—and by running them across the face of the acclivities, not only to avoid currents of water from the high grounds, but swampy places in the low grounds. Paths only of from four to five feet in width, were left in the highest parts of the ground, where wheel-carriages could not venture, but which were necessary as footpaths for the

inspection of the woods. These roads and paths were always formed before the ground was planted, as the lines of them could then be more easily traced on the ground. It was not found necessary to drain the acclivities of the mountains. Open cuts were formed in low swampy grounds, which were always planted with spruce instead of larch, as being a tree more suited to that particular state of the ground. The Duke frequently bears very favourable testimony to the value of the spruce tree, as supplying a superior and desirable sort of timber. These preparations, exclusive of the planting or the value of the ground, amounting to 18s. 2d. per Scotch acre, were no doubt expensive, but without them, justice would not have been done to the trees.

The season of planting the larch commences as soon as the last year's shoots are entirely stripped of their leaves or spines. In seedlings, this is long in taking place, not till the end of November or the beginning of December. About the 12th April the buds of the larch break forth rapidly into leaf. So that 65 days will embrace the longest period which can be allotted to the planting of the larch. With a planting-instrument one man will plant from 800 to 1000 larches in a day, and if 2000 plants are allowed to a Scotch acre, the cost per acre will be two days' wages of a man.

Finding great difficulty in collecting a sufficient number of three and four years' transplanted larches, the age at which he had begun to plant, the Duke resolved, previous to the planting of the large forest of 2409 acres, begun in 1800, on trying one or two years seedlings, or at the oldest one-year transplanted plants. After the large shrubs were entirely removed, young and small plants seemed more desirable than large ones, especially as young ones could be inserted with greater facility into the ground, and at much less cost than old ones. The plan of making pits with the spade is always an expensive one, and the planting in pits can never be accomplished with-

out the assistance of two people, one to hold the plant upright, and the other to shovel in the turf and earth with the spade. The turf being thrown on its back into the bottom of the pit, to facilitate its rotting, it forms a serious obstacle to the expansion of the tender roots of the young plant. These pits, when made in the beginning of winter, get filled with rain-water or melted snow, and even should the plants be inserted into them when they are in a dry state, the water may afterwards run into the hollow around the plant. This hollow in the top of the pit is formed from the circumstance of the earth, which had been taken out of it at first, being unable to fill it again: This is a property of mould well known to planters and labourers. The roots of the plants become chilled. Three or four years' old transplanted plants may be so chilled in this manner, as to prevent their pushing out a shoot above 2 inches in length in one season for several years. The slit, on the other hand, formed by the planting-instrument, resists all ingress of wetness or cold, the surface closing together as if it had never been cut, and the natural grassy covering protects the young plant from the severer effects of the frost. A one year old transplanted plant or a seedling, when inserted into a slit in the ground, takes immediate hold of the mould below, and grows onwards without molestation from the weather. This planting-instrument consists of a flat piece of iron, shaped like the head of a flat spear or a mason's trowel, 10 inches in length and 5 inches in breadth at the widest part; its neck, which is of one piece with the blade, is 7 inches long, and passes through and is rivetted to a cross handle of wood, that remains firm in the plane of the blade. The whole instrument is made stout, and of the best materials. It costs only 1s. 6d. In using this instrument, the planter holds it in one hand and the plants in the other, and he makes a slit in the ground of the requisite depth for the plant to be inserted; then pushing down

the roots of the plant carefully into the slit, so as that they shall not point upwards, he finishes the operation by treading with his heel the ground firm around the plant.

The expense of labour in planting was greatly reduced by the use of this instrument. Pit-planting required twenty men to pit and plant an acre in a day, whereas two men will do the same work in the same time with the spear-planter. The three and four years' old transplanted larch cost 10s. per 1000. The seedlings only cost 2s. 6d. per 1200. But besides this direct saving of expense in employing the slit to the pit planting, there is the advantage of scarcely one plant going back by the former mode; whereas, by the latter, many go back, which are obliged to be beet up afterwards with fresh plants, creating an additional expense; and many that continued to grow assumed a sickly hue for some years after they were planted. The following illustration will clearly exhibit the superiority of the slit system, in preserving the healthy growth of the plant. Of two years old transplanted plants that had been chilled in winter-made pits with cold and wetness, their growth is marked each year in the following table. The average length of the plants at the time of planting was 14 inches.

At 3 years old they were 1 foot 2 inches in height.

... 4	...	...	...	...	0	1 inch higher in 1st year after planting.				
... 5	...	...	...	...	0	2 inches	...	2d	...	...
... 6	...	...	...	...	0	4	...	...	3d	...
... 7	...	...	...	...	0	10	...	...	4th	...
... 8	...	...	...	...	1	0	...	...	5th	...

In all 3 feet 7 at 8 years old.

In the case of two years old transplanted plants having been planted in spring-made pits, which were not chilled, the following results were obtained, which are more favourable than the others.

At 3 years old they were 1 foot 2 inches in height.

...	4	...	...	...	...	0	4	...	higher in 1st year after planting.
...	5	...	...	...	...	0	10	...	2d ...
...	6	...	...	...	...	1	4	...	3d ...
...	7	...	...	...	...	1	6	...	4th ...
...	8	...	...	...	...	1	8	...	5th ...

They were 6 feet 10 high at 8 years old.

On the other hand, in two year-old seedlings planted by slit, the following results were obtained:—

At 2 years old they were 0 foot 10 inches in height.

...	3	...	...	...	0	10	...	higher in 1st year after planting.
...	4	...	...	...	1	0	...	2d
...	5	...	...	...	1	8	...	3d
...	6	...	...	...	2	0	...	4th
...	7	...	...	...	2	4	...	5th
...	8	...	...	...	2	6	...	6th

They were 11 feet 2 high at 8 years old.

So that the two year seedlings planted by slit were 4 feet 4 inches higher in eight years than the most favoured two-year old transplanted plants planted in pits.

It is an error to suppose that the larch will thrive in all soils and in all situations. There are many kinds of soils in which it will not thrive, and ought not to be planted. It has been found, that in soils which have been turned up by the plough, and which have borne white crops, the larch cankers. It cankers in wet situations also. In soils resting on a wet tilly subsoil it decays at the heart, after arriving at forty years of age. In situations where water stands for a length of time about the roots, it becomes fogged or covered with lichens. But in all rocky situations, and particularly those which are composed of mica-slate, containing crystals of garnets, among the fissures and fragments of which they can push down their roots, larches thrive to admiration. The geognostic character of the country from Dunkeld to Blair is primitive. At Blair is gneiss, at Dunkeld clay-slate, and the

intermediate space is occupied by mica-slate. They lie conformable to one another.

The advantages resulting from planting mountain-ground appear at first sight, in the greater number of trees that may be supported on the acclivity of a mountain than on a surface equal to its base. Trees derive nourishment from the soil immediately around the place in which they are fixed, and as the superficies of that soil must of course be greater on an acclivity than on the base, a greater number of trees will be there supported. Practically speaking, 100 trees at 6 feet apart can be planted on the hypotheneuse of a right angled triangle, whereas the base would only permit eighty at the same distance. Another and a great advantage derived from planting mountain-ground is, that, on an acclivity, the trees expose a greater surface to the influence of the sun, and air, and rain, than they can do on a level surface. That trees derive much nourishment from the air through the instrumentality of their leaves, there is no doubt. The experiment of taking the bark from fifty standing larches in May 1814 at Dunkeld, did not prevent their vegetation, and even forming wood for two years after. The outside trees in a forest are always the strongest. On an acclivity they all possess the advantages of outside trees, and at the same time most of the shelter enjoyed by those in the interior.

From the great scarcity of larch-plants at the commencement of the period of their being planted in Atholl, it was not possible to extend their cultivation beyond a very limited number or space in any one year. They were at first planted very little thicker in the ground, among other trees, than they would have been, had they been thinned out to stand for naval purposes. Generally in mixed plantations they were put in from 700 to 1000 plants per acre. In the first attempts at planting them entirely by themselves, they were increased only to 1500 plants per acre, from the want of plants. The keeping of the plants in the nursery-grounds till they

were three and four years transplanted from the seed-bed, tended greatly to decrease the disposable quantity of plants from such sources. Finding 1500 plants rather too few among broom and furze, they were increased to 1800 per acre. Even after seedlings were planted, which practice immediately let loose immense numbers of plants on the market, they were only extended to 2000 per acre, on the higher and barer parts of the mountain-range. 2000 per acre, the Duke thinks, may be considered by many sparse planting, and up to the region of broom and furze, that number may have enough to do to contend with them, for, however these shrubs might have been subdued for a time, and in many places completely eradicated, yet in more favourable situations, they would spring up again, were there not a sufficient number of trees to overtop and keep them down, by the exclusion of the pure atmospheric air. It must be observed, however, that were 3000 plants planted per acre, that would only bring the trees about half a foot closer to each other; whereas the lower branches of the 2000 having plenty of air, will meet one another when the plants are only eight years old from the seed, and they will then entirely prevent the growth of the shrubs. But, in the higher region, beyond the growth of the larger shrubs, 2000 plants per acre, the Duke maintains, are not too few, when it is considered, in the first place, that this sparse planting delays greatly the period of thinning, and, of course, curtails expense, which is an object of consideration in large undertakings. In the next place, it is well known, that the lower branches of the larch assist more than any of the others to strengthen the roots, and increase the thickness of the base of the trunk of the tree. Strength of roots and good girth give great stability to trees exposed to the fury of the elements in a mountainous country. The tops of the larch vibrate in the blast like the points of fishing-rods. By the time they are thinned they will individually be able to withstand great blasts of wind with impunity. Be-

sides, the lower and larger branches getting leave to remain for a considerable time, they will, during that period, have deposited a large quantity of leaves for the nourishment of the ground below.

The first great thinning will be of such value as to compensate for the great labour of performing it, when it is thus long delayed; but it could not have been so long delayed, had the trees been planted thicker. The Duke seems to be aware that the opinions of many planters, and practical ones too, run counter to the practice of thin planting, as recommended by him; but it is questionable whether any of them has had the experience of rearing larch to the height of from 700 to 1600 feet above the sea. At that elevated region, it appears to the Duke proper to follow the dictates of experience, rather than those of custom; and though he may himself have perhaps at first adopted it from necessity, arising from a difficulty of obtaining plants, he continued it when that necessity no longer existed, because he had seen the good effects arising from it. Thin as 2000 plants may appear on an acre, they will only stand 5 feet 3 inches apart.

The process of the thickening of the soil by the larch, being very important in its results, it deserves to be particularly described. The lower and stronger branches meet together in six or seven years after planting, so as to form a complete matting over the ground. The air and light being excluded by them, all plants that are under them die. At the same time the annual deposit of leaves from them, by means of decomposition, forms, in the course of time, a soil of considerable depth. At the age of 24, the larches lose the spines on the lower branches altogether, and that is the natural mark of their being ready to be removed by thinning, to a considerable extent. On the air being re-admitted by the removal of the trees, the surface of the new-made soil wherever it has been formed even among the rocks, becomes immediately covered with natural grasses, of which the *Holcus mollis* and *H. la-*

natus seem to predominate. These grasses continue to grow and to thicken into a sward by the annual top-dressing which they receive from a continued deposition of leaves. The improvement of the natural surface of the ground for pasturage, by means of the larch, appears to be a property peculiar to this tree. This pasturage is quite capable of improving the condition of cattle either in winter or summer.

With regard to other trees effecting a change on the natural surface of the ground, the following are the results of many experiments made by the Duke on the subject.

In oak copses the value of the pasture is only 5s. or 6s. per acre for 8 years only in every 24 years, when the copse is cut down again. Under a Scotch fir plantation, the grass is not worth 6d. more per acre than it was before it was planted. Under beech and spruce it is worth less than it was before; but the spruce affords excellent shelter to cattle, either from the heat of summer or the cold of winter. Under ash the value may be 2s. or 3s. per acre more than it was in its natural state. But under larch, where the ground was not worth 1s. per acre, the pasture is worth from 8s. to 10s. per acre, after the first 30 years, when all the thinnings have been completed, and the trees left for naval purposes, at the rate of about 400 to the acre, and 12 feet apart. Nay, so impressed was the Duke of the value of larch as an improver of natural pasturage, that he makes a statement to show that the pasture alone, independent of the ship-timber on it, would increase the value of land, by increasing its annual rental so as that it itself would repay the whole outlay of fencing and planting, at 5 per cent. compound interest, thus:—

3000 acres of land in its natural state, not worth above

1s. per acre, at 25 years' purchase, will give	.	.	L. 3750	0	0
Plants and planting at 6s. per acre,	.	.	900	0	0
2400 roods of fencing at 5s. per acre,	.	.	600	0	0
Sundry expenses at 3d. per acre,	.	.	37	10	0

L. 5287 10 0

L. 5287, 10s., at 5 per cent., compound interest for 29 years, the period at which the land is fit to be begun to be depastured, give L. 21,150; but 3000 acres at an improved rent only of 6s. per acre per annum at 25 years' purchase, yield L. 22,500.

The fattening properties of the grass will be best illustrated by a few examples. In November 1815, 25 small queys were put into a larch pasture at Dunkeld, and they were sold in May 1816, at an advance of 16s. 8d. per head, or at the rate of 9s. 2d. per Scotch acre. In the Duke's diary is this entry, on "Tuesday, 12th May 1818.—Twenty-one stots put into the Craigvinian larch plantation, which was fully as luxuriant in herbage as my best sown grass. The avidity with which the stots seized on the herbage, was the most extraordinary sight I ever saw. I intend trying ewes and lambs as well as cattle on this kind of grass." "Thursday, May 28.—Went to look at the cattle on Craigvinian, which I found improved already 7s. or 8s. per head. I ordered this month 150 head of cattle to be turned into the larch plantation at Blair, till the grass in the parks got up. Thirty years back, the same hill would not have afforded pasture for ten." Thirty stots put into the larch plantation at the Hermitage, improved 4s. a-head in the month of June 1819. On the 29th July 1819, is this entry in his diary: "Cutting grass under the larch at Newton,—a fine crop."

The great object of the late Duke, seems to have been to raise larch timber on his property, fit for naval purposes. With that view he planted his trees, and thinned his plantations. No demand for wood for mere country purposes would have warranted him to plant so extensively as he did. He found that larches could grow to great sizes at only 12 feet apart, and this distance gives 380 trees to the Scotch acre; which is little more than one-fifth part of the 2000 per acre originally planted.

The first thinning should consist of a light one of about one-fifth of the whole, by removing only those trees that are

of least value or worthless. After 24 years from the time of planting, the spines fall off the lower branches, which are of course no longer useful to the soil below. From 20 to 30 years old, then, the thinning is carried on so extensively, as to remove two-thirds of that which was left standing by the first thinning. In thinning, it is necessary to observe that all the strongest and healthiest trees should be left, even if two or three of them should be closer together than 12 feet. These small clumps happening to light on a favourable situation, they will thrive well, as the air has access to each tree, around two-thirds of its circumference. This thinning being delayed so long, the trees thinned out will be valuable for a variety of purposes. One of these purposes is the profitable use which may be made of the bark. The last thinning should be given when the trees are from 30 to 35 years old, which will leave from 380 to 400 trees per acre. The 380 will require a little pruning and trimming of the lower branches, in order to give head room to the cattle which are to browse on the grass below. The whole prunings and thinnings will cost about L. 5, and their produce will fetch about L. 12, leaving a profit on them of about L. 7, an acre.

The rapid growth of the young larch tree, even in exposed situations, is certainly matter of surprise. This property convinced the late Duke of the inutility of providing nurses for them. His gardener, Alexander Macrostie, whose name as a planter the Duke mentions with approbation, and who was at the head of all his Grace's plantations, but who, though a great admirer of larch, had not that confidence in them which his Grace possessed,—thought proper, during the Duke's absence, to beet up with Scotch fir, as nurses to the larch, some part of the plantations which had been made about the year 1800, before the period of seedling plants being used. This, as the Duke observed, was "the dwarf nursing the giant." In 1817, most of these Scotch firs had not attained a height exceeding 3 feet, while the larch, which

they were intended to nurse, were from 15 to 20 feet high. In the lower part of the same plantation, where the Scotch fir had grown to 20 feet in height, the larch exhibited a stature of from 30 to 40 feet; and, in the instance before referred to, in an elevated situation at 900 feet above the sea, where the Scotch fir were more than forty-two years old, they were only 5 and 6 feet high; whilst the larch in the same situation, and planted ten years after them, had reached up from 40 to 50 feet in height. In 1816, the Duke measured a larch, on a pinnacle of the highest ridge of the ground alluded to above, at only nine years after planting, which was quite straight and vigorous, and stood 16 feet high, and the nearest Scotch fir to it was only $2\frac{1}{2}$ feet. These, and other circumstances, made the Duke regret that he had ever planted the Scotch fir at all among the larch.

Taking the average height, then, of an average larch of eight years from the seed, at 11 feet, it will be nearly accurate to allow 16 inches as the annual growth till the tree is fifty years old, and after that only 10 inches per annum for twenty-two years longer, as the length of the tree lessens in growth as the bulk of the wood increases. These data give a larch tree, of seventy-two years of age, a height of 93 feet 4 inches, a fair average agreeing with actual experiment. The shoots of larches beyond thirty-five years of age are heavier, though they are not so long as those of younger trees. The larch, like the oak, puts forth two shoots every year, the one in spring, the other in autumn. The spring shoot has no lateral branches; the autumnal shoot pushes out like the spring one, but at the time this process is going on, the spring one is throwing out lateral branches. These lateral branches are firm and woody.

In regard to the growth of the girth, a larch tree, on an average, will acquire an inch in girth per annum, till it be twenty-four years old; and, from that time, till it has acquired the venerable age of seventy-two years, it will grow

1½ inch in girth every year ; thus,

In 24 years, it will be 2 feet in girth, at 1 inch per annum.

... 48 ... more, ... 5 1½

In 72 ... it will be 7 feet.

The larch begins to make wood at twenty-four years of age.

At 50 years old it will contain 26 cubic feet of wood.

... 60 14 more.

... 72 20

In all, 60 or one load of

50 cubic feet, and 10 feet more.

These results correspond exactly with the quantities which the Duke obtained at these respective ages. Larch appears to be on its greatest increase for timber from fifty-seven to seventy-two years old. A larch containing 50 cubic feet, or one load of timber, is quite fit for naval purposes. At half that size it is suitable for every country purpose.

A few examples of the sizes of the timber which the Duke felled may not prove uninteresting. In 1806, twenty larches at the age of sixty-four years, were cut for centres to the bridge building at Dunkeld. These trees having been drawn up by close planting, they were from 105 to 109 feet in length ; their girths were from 5 feet to 5 feet 4 inches, and they averaged from 80 to 90 cubic feet of timber. In 1810, eleven trees produced 1066 cubic feet. In 1810 and 1811, 600 trees were felled at Dunkeld and Blair, to send to Woolwich dock-yard, the aggregate amount of which was 606 loads. The timber was much admired by the best judges. One of the logs contained 83 feet of wood.

On an average, a larch 60 years old will yield 46½ cubic feet of timber. It cannot, therefore, be too much to calculate 50 cubic feet from trees of 66 years of age, and 60 cubic feet from trees 72 years old. In 1816, the largest one felled was 76 years old, but it yielded 249 cubic feet of wood : its site had,

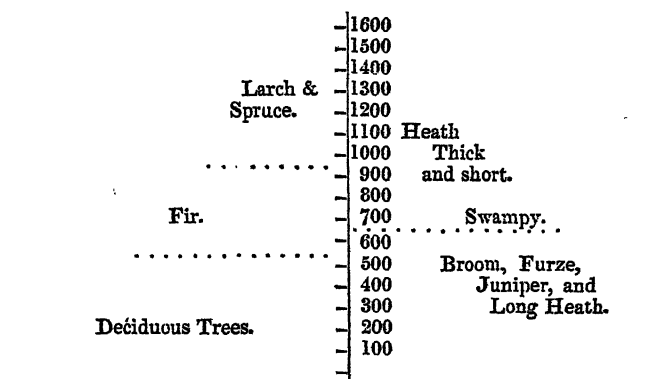
no doubt, been peculiarly favourable to its growth, but this example shows what it is possible to attain in the growth of larch timber. In 1818, the seedling larch plantation formed in 1815 was 2 feet 10 inches high, which was at the rate of 2 feet growth in height in three years. At that age the plantation made an appearance more than a mile off. On the north side of the Burn of the Barns, many larches were measured on 12th July 1819, when 50 years old, which were 7 feet in girth at 4 feet from the ground, and 100 feet in height. On 11th September 1819, 60 larches were cut for a steam-boat, at the age of 43 years, which were 5 feet 4 inches in girth at 4 feet from the ground, but they only contained 20 cubic feet of wood each. On 26th June 1820, the Duke measured many young larches in Loch Ordie plantation, that varied from 7 to 8 feet in height, at four years after planting them two years' seedlings. Fine shoots of larch and spruce were observed from $2\frac{1}{2}$ to 3 feet in one season; the shoots of the larch were longest in the dry season of 1826, some of the young plantation exceeding 4 feet in length. There are very numerous references in the diary, in regard to the growth of young larches, which it is unnecessary to notice farther. One or two facts of general application will conclude this part of the observations. The larch will thrive better in a northern than in a southern exposure, till they are about 30 years of age, but, after that period, there is no perceptible difference. This circumstance may be explained by the favourable effect of an equable temperature on the health of trees. The vicissitudes of frosts and thaws must produce a greater effect on the sunny side of mountains than on the opposite. The tallest larches do not always contain the greatest quantity of timber, as is instanced in the case of the two trees which were felled on 1st June 1829, aged 82 years. The one, which was only 97 feet in length, yielded 138 cubic feet, while the other, which was 104 feet in length, only gave 81 cubic feet.

One of the greatest advantages of planting larch, is derived

from its peculiar property of thriving in very elevated situations. Immense extents of mountain ranges may thus be applied to useful purposes, which otherwise would have been quite unavailable. The Scotch fir thrives at an elevation below 900 feet, but the larch ascends to 1600 feet above the sea, and it may ascend higher. This is an important fact, in a national point of view. Much of the mountain land of Great Britain, which is at present worthless, may grow timber to supply her navy and merchant shipping, without at all interfering with the land which produces her cereal crops, or even her fine pasture-land in a lower situation. But here the Duke anticipates an objection which might be started by some, and that is, Whether the larch will certainly become useful timber at these elevations? "An argument," says he, "may indeed arise, whether, all the upper part of the mountain being rugged, trees can grow in many parts to stand for timber at 400 per acre? Reasoning from the experience of forty-three years, which prove trees fully to that extent per acre to contain 10 or 15 cubic feet or more of wood already to exist, I am clearly of opinion that 400 trees may grow, within 70 years, to average one load of wood or more, at a height of from 1200 to 1600 feet above the sea; and the researches which the larch makes with its roots among the crevices of the rocks and the shivered fragments, is such, and the ground so found being virgin soil, that, along with the rains and mists imbibed by the tops and invigorating the trunk, I am quite convinced they will have the effect to produce a load of timber or more within the period mentioned. Some of the trees of the age of 57 years, cut in 1816, among rocks fully as rugged as those described, exceeded 60, and some 70, cubic feet of wood; and the 223 cut from similar situations, averaged, at 57 years of age, 40 cubic feet of timber, laid down at Woolwich dockyard in 1817."

Mountain planting may be very well illustrated by the following diagram, in which the space occupied by the larch is

seen to exceed greatly in height the site of every other species of useful tree. It also occupies, in common with the other trees, the ground at the lowest level; so that its range of growth is extensive.



These elevated regions are far above the range of the vegetation of the Scotch fir. This is a dull, heavy-looking tree in large plantations: it cannot withstand a strong wind, and it decays after it has attained an age of from 70 to 80 years. The larch is quite the opposite in all these respects; and it will supply ship-timber at a great height above the region of oak. Besides, the almost immeasurable extent of ground thus obtained by means of the larch for the growth of ship-timber, it is a more profitable tree in that respect than the oak. An English acre of larch at 12 feet apart will give 302 trees per acre.

						Loads.
100	larch trees,	at 64	years old,	would give	1 load per tree	= 100 0
100	ditto	68	ditto	ditto	1 ditto	= 100 0
102	ditto	72	ditto	ditto	1 do. 10 feet	= 122 10 ft.
302 trees, at an average of 68 years old, would give						322 10 ft.

It is said that 3000 loads of timber are required to build a 74 gun-ship. Ten acres, therefore, of larch would easily supply that quantity.

Now, an English acre will only grow 40 oaks at 33 feet apart, the distance required for their growth, and, allowing oak to yield a load of timber at 68 years of age, that would only yield 40 loads of timber per acre; or, in other words, it would require 75 English acres to supply the requisite quantity of oak to build a 74 gun-ship.

The larch, like other trees, is liable to accidents and diseases. Wind may drive them down by the roots, but it can very seldom break them, which shows the toughness of the wood. In November 1826, a hurricane was very fatal to the Scotch fir, and it tore up many larches by the roots. The depredations committed by wild animals are sometimes considerable, such as those done by red deer, the roe, hares, rabbits, and even the black game. Fences of good stone-walls will certainly form a powerful barrier against the inroads of all these creatures, but still they find an entrance into the woods by gateways and such like openings, for the sake of shelter. The red deer but seldom leave their more herbageous pasture about Blair; but the roe deer commit considerable depredations about Dunkeld, insomuch that war was obliged to be declared against them in 1816; and in that season 170 were brought in dead, and others dying from wounds, would swell the number of slain that season to upwards of 200. Before 1774 the roe-deer were not known to exist nearer than thirty miles to Dunkeld, and then they were scarce any where; but since they have received shelter and protection from the numerous young plantations, they have increased very fast in numbers. Their habits are peculiar; they always go in herds of odd numbers, from three to nine. The doe generally produces two at a birth, and can rear them easily; but one or both of the fawns are often destroyed by the foxes. The weight of a good buck with the skin, but without entrails, is 40 lb.; that of a doe from 32 lb. to 38 lb. The principal mischief committed by them is by the buck rubbing his horns between two trees to get rid of the velvet which covers them. A dozen of trees may be seen at one view, of from 7 to 8

years of age, completely stripped round of their bark. Both the buck and the doe eat the tops of the young larch. Hares and rabbits, but particularly the former, appear to be seized with an idle but mischievous curiosity to taste the tops of a new plantation in its first year's growth, though they never eat the tops they nip off. Not destroying for the gratification of hunger, their depredations are the more extensive. Black game, too, nip off the tops of young plants for a year or two, but they never eat them. Plantations above 700 feet of elevation are only annoyed by the deer.

Previous to the year 1795, a blight (occasioned by an insect) affected the larch, and of those in low situations many died. At that time the frost was very severe, and heavy frosty fogs hung about the trees in spring. After this phenomenon the blight appeared. Trees above 30 feet in height, and in high situations, escaped this affection, where the wind could shake them. This blight destroyed the flower of the larch, and prevented the formation of the seed, and, consequently, the propagation of the plant. The first appearance of the blight was indicated by a substance on the larch resembling small balls, of a fine white matter like cotton. These balls or nidi enclosed small insects, a species of *Aphis*, the two sexes of very different appearance. They appeared to live upon the juices exuding from the bark of the tree, and not upon the leaves; and they probably prevented the sap from ascending, at least no fresh shoots were thrown out by the tree that season. Many trees were much injured by this disease, and for a long time afterwards they presented a remarkable appearance, that of being completely covered over with lichens. The trees, however, shot up clean stems 20 to 25 feet above the fogged part, and these stems were as healthy as those of the healthiest trees that had never been affected. On cutting the wood, the fogged part was no more injured in quality than the wood of the healthiest trees, though the lichens had adhered to them for fifteen years. The effect of this

blight, then, was only superficial. The existence of this disease for eight or ten years certainly retarded the growth of the trees, but it did not cause the Duke to relax in the least in his efforts to form large larch forests. On the contrary, it impressed upon him the necessity of planting the high ridges of the mountains, in order that the trees might be placed beyond the influence of the disease, which did not appear higher than 600 feet above the level of the sea.

In felling large trees of larch, care must be taken to use plenty of rope, and to take advantage of the direction of the wind. A windy day should be avoided. It was found that, in digging the Scotch fir out by the roots from among the larch, the ground was much shaken about the roots of the larch, so as to endanger their stability. Ever after, the fir was cut over by the ground.

The seasoning of larch timber is accelerated by stripping off the bark before felling. In May 1815, the Duke experimented on 50 trees of larch at Dunkeld, that were growing in a situation among other wood that was nearly inaccessible for want of a road or path to it. In 1816 they were cut down and used for several purposes, and they appeared to be completely seasoned. They contained 25 cubic feet of wood each. Larch trees that had been only 10 months cut down were built into a steam-boat on the river Thames, but they had not been seasoned enough, as the planks above water, near the deck, shrunk a little. In this case, however, the scantlings were made the same as of oak, which were of too slight dimensions for larch.

The probable future supply of larch timber from the woods of Atholl is thus calculated by the Duke. The experiments performed on the value and durability of larch as ship timber, were performed chiefly on the 1900 trees planted by Duke James, and which had attained a serviceable size during the time of the late Duke. Of them only 800 or 900 were left as ornaments about the lawns and parks of Dunkeld and Blair. Unfortunately, a blank of fifteen years took place in the plant-

ing of larch by Duke John. To compensate, as far as was in the power of the late Duke, for this great deficiency in the regular supply of timber, he resolved in 1817 not to cut any trees for ship-building till the year 1832, thus sacrificing his own personal emolument for the sake of the estate. The most of the trees planted by Duke John were too young for ship-building. After 1832 the annual cuttings for ship timber may be calculated at the following rates:—

				Loads.	The produce of Acres.
12 years cutting after 1832 to 1844 =				1,250 annually.*	
10	...	...	1844 to 1854 =	8,000	} 2000
8	...	...	1854 to 1862 =	18,000	
8	...	...	1862 to 1870 =	30,000	
16	...	...	1870 to 1886 =	52,000	2000
18	...	...	1886 to 1904 =	120,000	3000
<hr/>					
72					

The second head of the subject was the consideration of the *Value* and *Uses* of Larch Timber.

The value of larch timber may be seen from the prices which the Duke received for it for various purposes. In 1806 the Duke cut twenty larch trees of the age of 64 years, to make the centres of the middle arch of 90 feet span of the bridge that was building across the Tay at Dunkeld. They were from 105 to 109 feet in length, and they contained from 80 to 90 cubic feet of timber each. After standing for three years as centres, they were sold by public sale at 2s. 8d. per cubic foot. In 1810, Messrs Symes and Co., ship-builders in Leith, bought eleven trees, producing 1066 cubic feet, at 3s. per foot. In February 1819, the Duke sold to Messrs Bolton and Watt, and laid down for them at Evan's Yard, London, 4176 cubic feet of larch, at 3s. 6d. per foot, for the building of steam-boats. Mr Ainslie, ship-builder, Perth, bought 500 trees, yielding not less than 12 feet each, at 1s. 6d. per foot,

* The most of these were planted by Duke John.

the buyer paying all expenses of cutting down and carrying away. The Duke also supplied larch for the building of two brigs at Perth; the one the brig *Larch*, built by Mr Brown, of 171 tons register; and another of 240 tons, built by Mr Ainslie. He also sent, at different times, large quantities to Woolwich dock-yard for the use of the navy; but the prices of these are not mentioned in the Duke's memorandums. Perhaps these latter-mentioned trials of ship-building were induced to be undertaken on the condition of the Duke supplying the timber gratis.

The value of larch wood, exclusive of the value of the pasture under it, may be estimated in this manner. Suppose the plantations are thinned out by thirty years to what they are to stand for ship-timber, that is, to 400 trees per Scots acre;—suppose, after that period, the whole were cut down at the following respective ages, the value of the whole per acre, at the different periods, would be as follows:—

400 Trees at 30 years old, at $2\frac{1}{2}$ cubic feet each tree, = 1000 cubic feet,	
or 20 loads, at 1s. 6d. per foot profit, = . . .	L. 75 per acre.
400 Trees at $43\frac{1}{2}$ years old, at 15 cubic feet each tree,	
= 6000 cubic feet, or 120 loads, at 1s. 6d. per foot	
profit, =	450 ...
400 Trees at 59 years old, at 40 cubic feet each tree,	
= 16,000 cubic feet, or 320 loads, at 2s. 6d. per	
foot profit, =	2000 ...
400 Trees at 72 years old, at 60 cubic feet each tree,	
= 24,000 cubic feet, or 480 loads, at 2s. 6d. per	
foot profit, =	3000 ...

The average of these prices would be L. 1381, 5s. per acre; so that L. 1000 per acre is not too high a calculation of the value of the Duke's larch plantations.

The comparatively superior value of larch to oak per acre, has already been alluded to, when the comparative quantities of timber per acre were made out by a statement in favour of the larch. In comparison to Scots fir, as a comparison of one

kind of fir with another, the difference is still more striking. Fifty larch and fifty Scots fir trees were cut out of the same plantation. The average contents of the fir were 8 cubic feet, at 1s. 3d. per foot, or 10s. per tree. The larch averaged 30 cubic feet each, and fetched 2s. 6d. per foot, or L. 3, 15s. per tree. So that the larch was superior in contents $3\frac{3}{4}$ times, and in value more than 7 times, to the Scotch fir.

The superior value of the common larch is also seen when it is compared with the Russian larch. The Duke, having heard of the valuable properties of the Russian larch, with some difficulty procured the seed of it from Archangel, reared the plants, and planted them out, in number about 200. They shot out about eight days earlier than the common larch, but they did not attain to one-third of its size in the same time; and, both in its appearance as a tree, and its value as timber, it is much inferior to the common larch.

The uses to which the larch tree may be applied are various and important. In one instance the Duke applied larches successfully as nurses to spruce firs, which were going back. The requisite shelter recovered the health of these valuable trees. The great thinnings of larch plantations which take place from twenty to thirty years of their age, supply useful materials for various purposes. Posts and rails for fencing may be made either out of the tops or the trunks of young trees. While fir posts and rails last only about five years, and are worm-eaten after that period, the larch-posts stand for twenty years, and never get worm-eaten. But the trunks of young trees are preferable for this purpose to the tops, as they have less sap-wood. In 1807, the Duke fenced a nursery-ground with young larch trees cut up the middle, made into a railing 7 feet high. In three years after, the sawn side assumed a leaden-grey colour, and in 1817 the whole railing was quite sound. The railing round the lawn at Dunkeld, made out of the tops of trees, was taken down in 1818, after it had stood for ten years. Six inches only of the posts were decayed un-

der ground, which being cut off, the rail was nailed up again. A rustic bridge was thrown over a high road and a ravine as an easy access to the nursery-ground, which remained in 1817 quite sound.

About the year 1800 the tanning properties of larch bark were tried by a tanner at Perth, by the Duke's desire. It succeeded tolerably well, but the tanner complained that the bark had not half the strength of oak bark. The bark of old trees cut at Blair, the Duke found quite unsaleable. The Duke was not at all sanguine about the bark of the larch affording a valuable tan ; but, in fact, though more encouraging markets had been found for it, it is questionable whether the loss arising from the deterioration in the quality of the wood, by being cut full in the sap, did not counterbalance all the advantages derived in the shape of increased value of bark. Even in the case of young trees which were appropriated to posts and rails after having been peeled for their bark, great expense was incurred in paint, in order to preserve the rails after they were deprived of their bark, which is a great preservation to posts and rails. If any profit is to be derived from larch bark to the grower, it must be from the produce of that great thinning which takes place when the trees are from twenty to thirty years old. The making of a road in June 1819, to carry off the wood from the top of Craig-y-Barns, gave the Duke a favourable opportunity of trying the peeling of the bark from trees that were cut down at that season of the year when the sap was quite full in them. Some of the trees that were fifty years old, peeled from end to end without difficulty, and each of them produced from 5 to 6 stones Dutch of bark. Thickly planted trees of thirty-three years of age, and 37 feet in length, and 25 inches in girth, 3 feet from the butt end, were also peeled, and they each yielded about a Dutch stone of bark. At an age of twenty or twenty-one, and height 28 feet, they yielded only half a stone ; but even this small quantity, calculated at the current price of larch bark at 10d. per

stone, gave 5d. a tree, a price greater than any Scotch fir near them was worth altogether, of the same age.

Tops which had lain cut for four years, and were of course well wore, were found useful in filling drains where stones were at a distance, and they continued sound in them for many years.

The larch was used for axles to different kinds of mills, from 1793 to 1802, and up to 1817 they continued quite sound, though constantly in water.

For buildings, too, the larch is found equally desirable. In 1779 the Duke built the shooting box in Glentilt, called Forest Lodge, the floors and joints of which were made of larch. The wood was under forty years old, and, as an experiment, some of the deals were cut up narrow, and others as broad as they could be wrought. In 1817 the narrow boards continued quite close together. After the bridge was thrown over the Tay at Dunkeld, the Duke altered the course of the great northern road to Inverness, which caused him to build new porter's lodge, stables, and offices to Dunkeld-House, near the new line of road. The whole wood-work of these buildings was executed with larch. They were finished in 1812. In 1813 part of Atholl House was burnt down, and the repairs of wood, consisting of joists, floors, doors, and windows were all made of larch. This wood was so red in colour that it looked like cedar. Several houses were also repaired in the town of Dunkeld with larch. At Dunkeld 271, and at Blair 170, larch trees had been used by 1817 for building purposes.

The first attempt to use the larch for the purposes of navigation, was in the construction of fishing-cobles on the Tay in 1777. Previous to that they were made of Scotch fir, and they lasted only three years, when they had to undergo a thorough repair. In fifteen years more, ferry-boats were constructed of larch instead of oak, for the conveyance of passengers across the different ferries on the numerous rivers on the

property. Of these ten large and twelve small boats were required. The oars, too, in the course of time, were made of larch, and they were found to be excellent in lightness, toughness, and elasticity. The buoyancy of the larch ferry-boats, and the ease with which they were worked, were strikingly illustrated on the ferry across the Tay before the present handsome bridge was built. One man could have ferried over sixty or seventy passengers at a time in the larch boat with as much ease as two could have done the same work in a fir one.

But the great and important purpose for which the larch was so extensively cultivated by the Duke, was the application of it to the construction of ships of war and in the merchant service. All the trials of the utility of larch timber having been made under the immediate inspection of the Duke, he thought he was justified in recommending its utility to the notice of the Admiralty, for the purpose of using the timber in the ships of the navy. Accordingly, he entered into a correspondence with the Honourable the Commissioners of Naval Revision, in 1807. In consequence, in 1809, 8491 cubic feet of larch timber were sent to Woolwich dockyard, 3600 feet of which were obtained from only sixty trees, and the remaining 4891 feet from 223 trees of only forty-two years of age, planted by Duke John. The greatest quantity of this wood was employed in the repair of the *Serapis* store-ship in 1810, because there was not enough of it to build a whole ship, and the state of its soundness was favourably reported on in 1817. One beam of it was put into the large frigate *Sybelle* in 1816, after it had lain six years in the dockyard.

This sample of larch did not get fair play in its transference to Woolwich. It had been floated down the Tay in rafts from Dunkeld to Newburgh, where it was drifted and knocked about for a long time, in expectation of a transport to convey it away. But all the transports at that time were put in requisition by the expedition to Walcheren. This treatment

certainly injured the external appearance of the timber, and so sensible was the Duke of this circumstance operating against the character of the new wood in the dock-yard, that he wrote to the Navy Board not to take it. They would have it, however, and sent down a transport for it, into which it was huddled together, and some of the finest trees warped in the stowing. The Duke observed an obvious prejudice against the wood among the workmen in the dock-yard, because it was *larch*. This prejudice arose in consequence of their having repaired a Russian vessel that was built of *Russian larch*, a very short time before the Duke's larch arrived; but the two kinds of larch, as has been already observed, are very different in their texture. Though they were obliged to praise the larch timber after it was cut up, the Duke regretted sending it under all the circumstances.

The next trial of larch in ship-building was in the *Sir Simon Clerk*, merchant vessel, of 375 tons register, built by Messrs Symes & Co. of Leith, in 1810. They got eleven trees, containing 1066 cubic feet, and they were formed into the first four or five planks, of $3\frac{1}{2}$ inches in thickness, on the bottom of the vessel from the keel upwards. This vessel was soon afterwards taken by the Americans, and no account could therefore be got regarding the durability of the timber.

In order to dress the ground, and lay it down properly to grass, upon which the sixty large trees sent to Woolwich had grown, the Duke caused the large roots to be extracted out of it. After they were out of the earth, the Duke was struck with their apparent capability of being cut up into knees for ships; and he immediately entreated the Navy Board to try them for that purpose, but the proposal was declined. Thus rejected, the fate of some of these roots, in the shape of knees, was curious; and is thus described by the Duke. "In 1811, an American vessel, the *Frances of Baltimore*, of 160 tons register, a brig, sustained very considerable damage on her voyage to Leith, and came in nearly a wreck. Messrs Symes

& Co., who repaired her, put into her some of these larch knees, offered to the Navy Board. The captain of the vessel said, he never saw any wood of so fine a quality, and so applicable for knees; and he was extremely urgent to know what kind of wood it was, and if he could get any more of it. They had no more to give him. Thus the first knees of British larch ever tried in Great Britain, were in the repair of an American vessel, and were carried out to the United States of America. "It may be said," adds the Duke, "that, as there is larch in America, the captain must have been an ignorant man not to have known that wood; but the American larch (*Larix microcarpa*) is entirely a different wood, and is very ponderous, and quite unfit for knees, and, as I think, for ship-building." Some larch knees were put into two brigs that were built by Messrs Symes & Co. in 1811; the one a brig of 230 tons, and the other, the *Breadalbane*, of 260 tons register; but both vessels having been lost in their second voyage, no satisfactory trial could be said to be obtained from them in regard to the value of larch as knees.

The larch has been tried in a small way as masts. Three sloops at Perth were fitted up with them, but as they all soon left the Tay, its value as such could not be ascertained. The masters of the vessels spoke highly of them. But it was the Duke's practice to plant spruce in all the wet parts of the ground which he planted, to the amount of about one-tenth, expressly for the purpose of raising masts and spars, for which he conceived the spruce peculiarly well adapted. It may not be here out of place to give the following extract from the Duke's diary of 17th March 1821, in praise of the spruce. "One year transplanted appears to me the best age to put in spruce. The size and beauty of this tree, and the thriving way in which it grows under the shade of the fir, is most admirable. Even now, I will venture to say, that there is nothing in Britain to compare with the spruce from the Hermitage throughout Craigvinian, for miles together. Indeed, I have been for

some time of opinion, that, in point of beauty, as well as utility and profit, it may be equal as timber, if not superior, to the larch."

All these trials in the merchant-service being of short duration, they were particularly unfortunate to the Duke, as depriving him of all authority upon which he could establish the fame of the larch as a desirable timber for ship-building.

A report, however, favourable to the state of the larch in the *Serapis* was made, after she had been surveyed by Messrs Sture and Brain. This report was made on the 14th August 1812, and on the 31st January 1817, the beam in the *Sybelle* was quite sound. The 223 trees, which were only forty-two years old, were converted into piles, and driven into the river Thames in the front of the works of Woolwich dock-yard. The report on their state, in 1817, was as follows. A piece was cut off the top of one pile; the same pile was cut through at the average high-water mark; and the same pile was cut through even with the mud. These piles were driven in December 1810, and they, along with some finer work of boarding, which was nailed up in front of Woolwich dock-yard, facing the Thames, were as fresh in 1817, as they were when driven in in 1810.

The great and important trial of the larch as a valuable tree for naval timber, was made from 1816 to 1820, in the building of his Majesty's frigate the *Atholl*. Her keel, masts, and yards were made wholly of larch. She was launched on 21st November 1820. Her dimensions are as follows:—

		Feet.	In.
Length of deck,	. . . . . ,	113	8
Keel for tonnage,	. . . . .	94	3 $\frac{1}{4}$
Extreme breadth,	. . . . .	31	6
Moulded,	. . . . .	31	0
Depth of hold,	. . . . .	8	6

Admeasurement, 499 $\frac{3}{4}$ tons.

She carries 20 guns of 32 lb.

6 ... 18 ...

2 ... 6 ...

In all, 28 guns.

Her main, fore, and mizen masts, with their top-masts and topgallant-masts, and their respective yards, bowsprit, sprits, and tops, tit-booms, and speddling-booms, were all of larch. She drew of water, afore, 8 feet 11 inches, and abaft, 11 feet 3 inches. When launched, her weight was 267 tons.

The *Niemen* frigate, built of Prussian fir, and of exactly the same dimensions as the *Atholl*, and launched the day before her, drew 9 feet water afore, and 11 feet 6 inches abaft, and weighed, when launched, 286 tons.

The *Ranger* frigate, of similar dimensions, but built of oak, weighed, at the time of her launching, 350 tons.

The larch wood required for the building and fitting of the *Atholl* was as follows:—Cut down at Dunkeld, in the summer and autumn of 1816, 350 larch trees, of from 56 to 72 years old, which yielded from $34\frac{1}{2}$ to 60 cubic feet of timber each. They produced in all 15,350 cubic feet, or 307 loads of timber. There were cut also at Dunkeld 50 trees, of only 47 years old, yielding each 26 cubic feet, or 1248 feet in all of them. At Dunkeld, there were cut down 400 trees, yielding 16,598 cubic feet, or 332 loads of timber. At Blair, in the autumn of 1817, there were cut 372 trees, from 46 to 76 years old, averaging about 50 feet each, and yielding 18,468 feet or 369 loads of timber. Both places contributed 772 trees, yielding 35,066 cubic feet, or 701 loads of timber, or an average of 45 feet to the tree.

Many minute inspections took place at different times, by competent judges, of the state of the larch in the *Atholl*; and all are very laudatory of its qualities as ship timber. The following important particulars regarding the larch in general, were related by Mr Symes of Leith, after he had inspected

the *Atholl* in Leith Roads, in July 1824. The larch becomes harder and more durable by age in a ship. It holds iron as firmly as oak; but, unlike oak, it does not corrode iron. Iron bolts may be driven out afterwards perfectly clean. It does not shrink; the *Atholl* had been caulked but once in four years. It possesses the valuable property of resisting damp, inasmuch as the pump-well was as dry as the cabin. This is a very important fact, as regards the durability of the ship, and the health and comfort of the crew. The beams and knees in the gun-deck were as well finished as the best joiner's work, and they had no appearance of shrinking or straining. The officers were all highly pleased with her. She was not a fast sailer, but was a capital sea-boat. Neither of these qualifications depends on the materials, but on the construction of the vessel; and in such ships, they are greatly influenced by the position of the masts and the stowing in the hold.

A communication from the Navy Office, of date 13th December 1827, founded on a report of the condition of the *Atholl* and *Niemen* frigates, states that the *Atholl* at that time would "only require very small repairs, whereas the *Niemen*, built of Baltic fir, was found so very defective as to be proposed either to be broken up or taken to pieces."

Although preparations were made for the building of the *Atholl* at an earlier period than for any other ship to be built entirely of larch, yet the Duke, ever alive to the interest of his favourite wood, caused Mr Brown of Perth to build a brig entirely of larch, at the same time that the *Atholl* was building. The smaller vessel was of course first ready, and she was launched on the 6th August 1819, and very appropriately denominated the *Larch*. The history of this brig, of which there are ample details, affords very satisfactory evidence of the utility of the larch for the construction of ships in the merchant service. She was registered at 171 tons, though she could carry a cargo of 300 tons dead weight. She was commanded by an enterprising master, who went in her

almost over the whole globe, and she never so much as carried away a spar for a period of eight years, till at length she was wrecked on the Island of Tendra in the Black Sea, on the 27th November 1827, through the ignorance of the pilot. She was a fine sea boat, a fast sailer, and so tight, that she always brought her cargoes of dried fruit from the Mediterranean in excellent condition, to which her consignees bore testimony. Her wrecked hull was sold to some people in Odessa, and though it lay high on the beach of the Island of Tendra for two years, exposed to the vicissitudes of summer and winter before she was launched off again, such were the strength and toughness of her timbers, that it never went to pieces.

While this brig was building at Perth, Rear-Admiral Otway sent a master and carpenter of the navy to inspect her; and they went up to Dunkeld to meet the Duke, who showed them some of his extensive larch plantations, with which they were very favourably impressed. Their report of the brig, which was peculiarly well and strongly built, had, no doubt, encouraged every one in the success of the Atholl, which was building at the time.

The next trial of the larch in ship-building was in the case of the *Diana* steam-boat, built by Messrs Bolton and Watt, to ply between London and Richmond. She was built in the summer of 1820, entirely of larch from Blair, only forty-five years old, and planted by the Duke himself. The wood was built in the vessel only ten months after it was cut, and had not sufficient time to season. Nevertheless, she was an excellent fast-rated boat, going to Richmond with a crowd of passengers, amounting to 200, 16 miles in two hours, and against the stream all the way in three hours. She drew 8 inches less water than any other steam-boat in the river of her class.

A brig of 240 tons was built by Mr Skene, the ship-builder, at Perth, in the summer of 1825, with 499 trees, containing 6200 cubic feet of Kinvaid larch timber. If the builder got

her sold when she was launched, he was immediately to have built another of larch, but no future mention is made of this vessel.

At the same time, Mr Ainslie of Perth bought 500 trees, not under 12 cubic feet each of wood, to build a brig.

Among the properties of larch, which may be considered as valuable in respect of ship-building, is the one of its being slow of kindling by fire. Though hot embers be thrown on a floor of larch, it will not get suddenly up into a blaze, like other kinds of fir. It is admirably adapted to be formed into wooden steps for guard-ships, or quays, the edges of them not breaking or splintering like other fir-wood. The property of its not splintering makes it a valuable wood for the upper-works of men-of-war. The splinters made by cannon-shot are often more hurtful to the seamen in action than the shot themselves. A shot-hole through larch closes and does not splinter. Larch treenails were allowed by Sir Robert Seppings to drive remarkably well. The iron nails which were drawn quite clear out of the wreck of the ferry-boat on the Tummel, whose fate will be described below, were shown by the Duke to Sir Byam Martin and Sir Robert Seppings.

The products arising from the chemical treatment of larch-wood, may be useful to the arts. The following results were obtained by chemical experiments made by Mr Brown of Old Brompton, on the 19th March 1828. A piece of larch-wood of 6 lb. weight, was placed in a retort, which was heated to a red heat, and $31\frac{1}{2}$ cubic feet of olefiant gas came over. This gas was not fit for the purposes of illumination. Of crude pyroligneous acid, there was $1\frac{1}{2}$ pint. Half a gill of tar of superior quality to that made from coal, and 1 lb. 9 oz. of charcoal were the rest of the ingredients obtained. The pyroligneous acid in the crude state is sold in large quantities for 7d. per gallon. It may be obtained from the loppings of the larch trees. Charcoal in large quantities varies in price from 1s. 7d. to 1s. 8d. per bushel. Pieces of wood 29 inches in

length, and 4 inches in diameter, could easily be converted into charcoal, for which there is a demand in this country to the value of L.10,000 yearly.

Some examples may now be given, under the third head of observations, of the *elasticity, durability, strength, and resilience*, of larch timber.

The larch-tree is evidently an alpine plant, and thrives best in elevated situations, and yet, when it is planted in low and even dampish situations, like those in which many were placed in the time of Duke James, it continues sound, when some other kinds of wood either go back or decay. Of the Duke James's larches, not two out of 900 trees were decayed in the heart. Larch-trees do not lodge and break down with snow, their sharp-pointed top affording no rest for it. The tree may be uprooted by wind, but it very seldom breaks over by the stem, and even in the former respect, very little damage had occurred to the larch during forty-two years.

In 1793, a ferry-boat was constructed of larch, to ply across the ferry on the river Tummel. It did so for fourteen or fifteen years without repairs, when it was carried down one day by a sudden rise in the river, and dashed against rocks and other objects, for seven or eight miles. The wreck was embedded in the sand and mud of the river Tay, till the breaking up of the strong ice in the severe winter of 1814 brought it up, and carried it down and deposited it on the lawn at Dunkeld. Its keel was formed of oak and larch. The oak was decayed, the larch was sound. The larch part of the keel the Duke caused to be squared, and sent up to Woolwich dock-yard. The wood of which the boat was built was under fifty years of age, and the sap and heart woods were not separated.

The state of the piles driven in front of Woolwich dock-yard on the Thames, is one proof of the durability of the larch for such purposes. Another instance is to be seen in the case of the beam of larch, containing from 50 to 60 cubic feet of wood, which was fixed across the river Erecht in Perthshire

in 1783, to form a barrier to prevent the salmon from ascending that river. Exposed to the wetness and drought of the seasons, it remained in 1817 quite sound, though beams of foreign fir had been tried before, which never withstood the vicissitudes of the weather above five or six years. A report was made to the Commissioners of the Navy on the 8th September 1819, on the state of the larch-built boat belonging to the Bridport packet of Dundee, one of the regular trading smacks between that port and London. Its timbers, thwarts, stern, and keel, were made of oak, but all the planking, which was clinkered, was made of larch. After twelve years' service, without repairs, except at the gunwale, which was sometimes stove in against other boats, the boards were all sound, and not nail-sick, as is very common in boats built of other materials, before they are half the age of this one.

The following Table will shew the result of experiments made at Woolwich in 1808 on the comparative strength of Atholl larch, Riga fir, and American white pine.

Date of the Experiments.	Description of the Timber.		Dimensions of the Battens.		Weight of the Battens at the time of Experiment.	Distance of the Fulcrum from the end of the Battens to which the weights were affixed.	Curvature received by the Battens under the pressure of		Curvature remaining after the removal of the weight.		Weight under which	
	Quality.	How long kept in Store.	$\frac{3}{4}$ in.	$\frac{1}{2}$ in.	lb. oz.	ft.	inches.	Half hundred weight.	One hundred weight.	inches.	cwt. qrs. lb. oz.	cwt. qrs. lb. oz.
1812. 16th June.	Larch { Outside Heart	4	6 0	2 by 2	5 8	5	0	7 $\frac{3}{8}$	10 $\frac{1}{2}$	$\frac{1}{8}$	1 0 14 0	1 2 2 0
		4	6 0	2 x 2	5 10	5	0	3 $\frac{1}{2}$	7 $\frac{1}{2}$	$\frac{1}{4}$	1 0 14 0	1 0 14 0
		4	6 0	2 x 2	5 5	5	0	5 $\frac{1}{2}$	10 $\frac{1}{2}$	$\frac{1}{4}$	1 0 20 0	1 0 25 0
	Riga, dry	4	6 0	2 x 2	5 8	5	0	3 $\frac{1}{2}$	6 $\frac{1}{2}$	$\frac{1}{4}$	1 1 20 0	1 1 22 0
	American White Pine, wet	6	6 0	2 x 2	7 6	5	0	3 $\frac{1}{2}$	10 $\frac{1}{2}$	.....	1 0 7 0	1 0 7 0
		8	6 0	2 x 2	6 7	5	0	3 $\frac{1}{2}$	10 $\frac{1}{2}$	1 $\frac{1}{2}$	1 0 7 0	1 0 10 0

The average and relative strength of the three species will therefore stand as under, viz.—

	Average Strength. cwt. qrs. lb.	Relative Strength.
Larch,	1 1 8	1.000
Riga, dry,	1 0 7	.804
American White Pine, wet, ...	1 0 10	.824

Or about $\frac{1}{4}$ less than the Larch.

The above experiments were tried in the presence of Captain Bayntun, R. N. and the first was also witnessed by his Grace the Duke of Atholl, Commissioners Peake and Thomson, George Yeats, Esq. &c. &c.

J. LE BARRALLIER.
JOHN PEAKE.

Mr Tredgold, the celebrated engineer, also made experiments on the comparative strength of Atholl larch, Riga fir, Memel fir, and English oak. These results first appeared in Tilloch's Philosophical Magazine in March 1818.

The pieces were each an inch square, except No. 3, which was only 8-10ths of an inch in breadth. The numbers in the Table show the weights it would have borne if it had been an inch square; the pieces were supported at each end, and were loaded by putting 5 lb. at a time into a scale suspended from the middle;—the distance between the supports 30 inches.

Description of Timber.	No. 1. Memel Timber.	No. 2. Red Larch.	No. 3. Red Larch, old and very dry.	No. 4. English Oak.	No. 5. English Oak.	No. 6. Riga Timber.
Compar. stiffness— or the weight that bent each piece half an inch	145 lb.	80 lb.	93 lb.	60 lb.	65 lb.	125 lb.
Compar. strength— or the weight that broke each piece	212 lb.	253 lb.	295 lb.	222 lb.	231 lb.	212 lb.
Compar. extensibi- lity—or the space through which the middle had bent at the time of fracture	2·25 inch.	3 inch.	2·75 inch.	2·5 inch.	1·4 inch.	1·3 inch.
Weight of a cubic foot of each kind of timber in the nearest whole num- bers	34 lb.	40 lb.	31 lb.	41 lb.	46 lb.	30 lb.
Remarks.	Broke short.	Splin- tered.	Broke short.	Broke short.	Splin- tered.	Broke short.

As the strength of small pieces depends much on the position of the annual rings, the pieces were placed as nearly alike in this respect as possible. When the pieces were in the position in which they were broken, the dark lines or portions of the annual rings that appear in the section of a piece were

vertical.—From the results exhibited in the preceding Table, it appears very clearly, that *Larch* is best adapted to resist the force of a body in motion.

But to leave no doubt of the superior resilience of larch timber, the following experiments were made. These experiments were performed by Mr Tredgold, in the presence of his Grace the Duke of Atholl, Lord Prudhoe, Lord James Murray, John Deas Thomson, Esq. William Adair, Esq. Mr George Bullock, and Mr Atkinson, architect to the Ordnance.

The pieces were each an inch in depth, and laid upon supports thirty inches apart. The weight fell between two vertical guides (similar to a pile engine), upon the middle of the piece.

No. of Exper.	Description of Timber.	Breadth of the Piece.	Weight.	Height from which the Weight fell.	Effects.
No. 7.	Oak, same kind as No. 4. }	1 inch.	7 lb.	48 inches.	Broke.
No. 8.	Larch, same kind as No. 2. }	1 inch.	7 lb.	48 do.	No effect.
	The same			54 do.	No effect.
	The same			60 do.	{ Set to a slight curve.
	The same			66 do.	{ A little more curved.
	The same			72 do.	{ Curved about an inch.
	The same, convex side upwards }			72 do.	{ Curved the contrary way.
	The same		14 lb.	42 do.	Broke.
No. 9.	Larch, same kind as No. 3. }	0.8 inch.	14 lb.	48 do.	No effect.
	The same			54 do.	Broke.
No. 10.	Oak, same kind as No. 5. }	1 inch.	7 lb.	48 do.	No effect.
	The same			54 do.	Broke.
No. 11.	English Oak	1 inch.	7 lb.	54 do.	No effect.
	The same			60 do.	Broke.

No. 11. was a dark-coloured and apparently very strong piece of wood ; specific gravity 0.872, or $54\frac{1}{2}$ lb. per cubic foot. On the whole, then, it appears that *larch* is superior to oak in stiffness, in strength, and in the power of resisting a body in motion (called resilience) ; and it is inferior to Memel or Riga timber in stiffness only.

The Duke received a communication from an English gentleman in Rome, of date 21st March 1829, with which he sent the Duke a piece of a beam of a ship, said to have belonged to the Emperor Tiberius. This vessel was said to be 400 feet in length, 200 in breadth, and 45 feet in height, and she was launched on Lake Nemi, near Rome, for the Emperor's pleasure. The vessel is supposed to have burnt to the water's edge, and her hull sunk. Francisco Marchi, a celebrated architect and military engineer, who flourished in 1535, gives the above account of this vessel, and her wreck was to be seen in his day, when the waters of the lake were low and calm. She was built of various kinds of wood, of which the larch formed one, and it was quite fresh, though it must have remained under water for about two thousand years. The other kinds of wood were petrified ; but how the wood was so easily known as larch, after it had been so long immersed in water, is not mentioned in the gentleman's letter, nor by the Duke himself.

It is thus to be seen that the late Duke of Atholl left no means untried, whether they were of a practical, physical, or chemical nature, to ascertain the properties of the larch timber, and to him their results appeared highly satisfactory.

In connexion with the subject of the larch, to the consideration of which this paper has been exclusively devoted, it is but justice to the memory of the late Duke, to give the following tabular view of the extent of all the kinds of wood which he planted. It is only necessary to premise, that of these 900 acres had been planted when the Duke succeeded to the estate in 1774, consequently he planted 12,478 Scotch, or 15,573 English acres, which consumed 27,431,600 plants

DIVISIONS,	OAK.	LARCH.	SPRUCE.	SCOTS FIR.	MIXED.	BIRCH.	TOTAL.
	Ac. Dec.	Ac. Dec.	Ac. Dec.	Ac. Dec.	Ac. Dec.	Ac. Dec.	S. Ac. Dec.
Dunkeld	11-763	279-977	...	207-933	195-432	...	695-155
Fungarth	117-958	...	...	5-663	1-834	...	125-455
East Boat, &c.	23-067	175-476	...	38-000	20-308	...	256-851
Drumbuie	132-000	464-486	11-335	...	100-877	...	708-698
Letter & Lows	53-709	291-501	...	28-770	2-000	2-684	378-664
St Columbus	37-106	530-139	...	...	258-544	...	825-789
Guay, &c.	88-510	95-200	...	...	11-006	...	194-716
Loch Ordie	20-000	2791-122	150-	...	...	...	2961-122
Loch Hoishnie	...	2031-870	200-	...	...	...	2231-870
Inver, &c.	104-196	116-103	15-474	25-036	350-284	21-613	632-706
Dalnarnock	118-114	713-795	...	34-000	84-715	...	951-324
Laighwood	24-768	...	...	...	...	...	24-768
Kincraigie	1-493	1-250	...	...	...	...	2-743
Kinnaird	...	...	...	...	91-186	...	91-186
Dalcapon	110-158	...	...	...	4-000	...	114-158
Tulliemett	78-353	161-987	...	...	...	...	240-340
Edradour	42-142	99-433	...	...	11-910	...	153-485
Balnemoor	18-450	500	...	...	...	...	18-950
Balnaguard	...	...	...	9-500	...	...	9-500
Logierait	80-000	253-200	...	...	...	...	333-200
Killichangie	28-263	299-503	...	...	...	...	327-766
Around Blair	...	300-	...	...	1000-	...	1300-000
Strathord	...	...	...	...	800-	...	800-000
TOTAL	1070-750	8604-542	376-809	348-952	2932-096	24-297	13378-446

It is gratifying to see a person of rank and fortune devoting the greater part of his time to the improvement of his estate. Few, perhaps, on account of their public duties, can employ any considerable portion of their time in this manner, and fewer have the inclination, even when they possess the leisure. The late Duke of Atholl was certainly an extraordinary instance of a patriotic country gentleman; but his example may be followed by every one, however limited the field of his operations. The above details afford but a very inadequate idea of the extensive improvements effected by his persevering energy, to form a true estimate of which, it would be necessary to inspect the magnificent forests with which the previously desert and dreary ranges of the valleys of the Tay and Tummel have been clothed. Among the numerous cultivators of wood in Britain, none has hitherto held a higher rank than the late Duke of Atholl, whose name must henceforth occupy a conspicuous place in the list of those who have eminently benefited their country.

[The species of Larch spoken of in the preceding paper, as extensively cultivated by the late Duke of Atholl, is the Common Larch of this country, sometimes called White Larch,—the Meleze of the French, and Lärche of the Germans. It is the *Pinus Larix* of Linnæus,—the *Larix europæa* of Decandolle.

In the year 1820, the Duke sent to the Horticultural Society of London specimens of five kinds of Larch grown on his estates in Scotland, accompanied with observations on them; and this communication, with notes thereon by Mr John Lindley, now Professor of Botany in the University of London, was published in the fourth volume of the Transactions of the Society, p. 416.—The kinds were, 1. The Common Larch above mentioned, having pink flowers. 2. The Tyrol Larch with white flowers: the cones also remarkable for their whiteness, and for being erect, not cernuous. The shoots of the Tyrol larch are generally stronger than those of the common larch; but the foliage of both kinds is similar. 3. The Weeping Tyrol Larch, a variety of the common, with pendulous branches; but distinct in botanic characters from the *Larix pendula*, or Black Larch of North America. 4. The Red Larch of North America, or *Larix microcarpa*. This species is remarkable for the great specific gravity of its wood, which is so ponderous that it will scarcely swim in water. Its cones are shorter or smaller than those of the common larch; its branches weaker, and its leaves narrower. 5. The Russian Larch, (already mentioned, *supra*, p. 201), raised from seed procured by the Duke from Archangel about the year 1806. The bark is cinereous, not yellowish-brown; the leaves come out so early that they are liable to be injured by spring frosts. The *Larix pendula* or Black Larch of North America, and *Larix daurica* of Dr Fischer of Petersburg, are distinct species, no examples of which exist at Dunkeld or Blair.]

ACCOUNT OF A NEW MODE OF THICKENING HEDGES, AND PRODUCING BRANCHES ON TREES, BY MEANS OF INCISIONS IN THE BARK. *By Mr CARMICHAEL of Raploch Farm, Stirlingshire.*

[The object of the experiments related in the following paper, was to procure lateral branches from the bare stems of thorns, and other ligneous vegetables, and the result being stated as satisfactory, it is only necessary to explain the manner in which it has been effected. The sap in circulating or ascending, naturally moves along the bark of a bare stem with even surface, without exerting any tendency to develope lateral shoots; but as there may be germs, which, however, without a direct stimulus might remain inactive, on different parts of the stem, the temporary interruption of the course of the sap, by accumulating it at a given point, may give an impulse to these germs, or produce the formation of new ones, by which lateral branches are produced. The experiment is not new, but its application to thorn-fences may be beneficial.]

A THORN-HEDGE, when properly managed, surpasses in appearance and durability any ordinary field-fence. As thorns dislike the extremes of wet and dry, they never succeed in situations where they are exposed to too much moisture, or where the soil is arid; and in cold exposed places their stems become covered with grey lichens, indicative of an unhealthy condition. When such cold soils are not trenched previously to planting, hedges and trees make slow progress, especially when the ground is stiff, and opposes the shooting of the roots. Very light gravelly soils are also unfavourable to the growth of thorns. But the greatest error usually committed in rearing thorn-hedges, is the neglect of keeping them clean

and properly trimmed when young, many years often elapsing before a weed is removed, or a twig cut; the consequence of which is, that the hedge is choked, or shoots up in patches of unequal height and irregular form, with few lateral branches, which at the same time are allowed to extend, so that the hedge soon becomes as broad as high. The overshadowing top thus formed, prevents the growth of lateral shoots on the lower part of the stems, by obstructing the light and air, and the hedge looks like a canopy supported by bare sticks. No hedge looks so neat, or lasts so long, as one kept in nearly the form of a stone-wall, the proper dimensions being from three to four and a half feet in height, from one to two feet in breadth at the base, the sides inclining upwards, until the diameter at the top is two or three inches.

Such neglects in the early management of hedges have hitherto been considered irreparable, or not to be remedied otherwise than by cutting the whole a few inches from the ground, and training it up anew. This mode, however, although certainly efficient, is not always convenient, on account of the time required before the new fence can attain a sufficient height; and the method of *plashing*, as it is termed, soon kills root and branch, while the practice of planting young thorns among the roots, or in the gaps of an old hedge, never answers, unless the whole is cleared away and reduced to one height.

In 1824, I therefore tried the following method, which has since been continued, with uniform success, on the hedges of a farm near Stirling, which had previously been much neglected, but which could not be cut down without great inconvenience and expense. Many of the stems being almost entirely destitute of lateral branches within two feet of the ground, a horizontal cut or semicircular incision was made in the bark, by which from a quarter to half-an-inch in breadth of both layers of the bark was removed fully half-way round

the stem. In a few weeks, buds appeared, and shot forth, usually close under, but sometimes over the incision. This simple operation, performed by the hedge-bill or a pocket-knife, early in spring, does not seem in the least degree to injure the thorns, for the cut being clean, and not deep, no canker ensues, and it soon closes up again. Indeed most of the stems are now completely healed, so that nothing remains but a slight scar in the place: the object being to intercept the sap in its ascent, the wood need not be cut, and it is only necessary to remove the narrow belt of both barks; but care must be taken that no shred of the inner bark remains to continue the circulation. The partial interruption thus produced, cannot do any harm, as it merely causes a lateral exertion in the sap-vessels to overcome the obstruction, and the sap thus accumulated gives rise to the new branches, so that the same stem may be cut at two or more places if necessary. The artificial branch seldom failed to appear when the stems were healthy, and have sometimes attained a length of two feet the first season. But as such tender twigs are apt to be hurt by frost, if cut too young, they were not touched till the first, or sometimes the second, spring after, when such as required it were cut off a few inches from the stem, which caused an immediate subdivision of each branch. Thus, by means of these semicircular incisions, and by occasionally cutting out a bare irregular stem, the ragged ill-filled hedges have been continued at the regular height, and at the same time trained into a uniform breadth and thickness, not attainable by any other method.

Having succeeded so well with the thorns, the experiment was tried in February 1829, on a few forest trees, about six inches in diameter. The incision was made as above described, at about six feet from the ground, and in some of the trees immediately above slight swellings, indicative of a tendency to shoot forth branches. The consequence was, that a new branch sprang out the same season, from almost

every one of the trees. In the thorns, however, no search had been made for these eyes, and few or none were observed. The object in these last experiments was to ascertain, whether a tree intended to be ornamental, but which had been forced up by thick planting to a long pole, might be made to assume a better form ; and so far as they have yet been carried, they seem capable of producing the desired effect.

ACCOUNT OF THE IMPROVEMENT OF ONE HUNDRED AND THIRTY ACRES OF LAND, COVERED BY PEAT TO THE DEPTH OF TEN FEET. *By Major GRAHAM of Meiklewood, Parish of Kincardine, Perthshire.*

[The following account of the improvement of a tract of moss, for which the Society's Gold Medal has been awarded, has been considered of sufficient importance to be communicated to the public, more especially as the removal of the incumbent layer of peat was effected through the agency of water raised by steam, a method which had not previously been employed for such a purpose, and which might be advantageously adopted in many parts of the valley of the Forth.]

HAVING on my property, in the parish of Kincardine in Perthshire, situated on the northern bank of the Forth, a piece of land measuring 130 acres, covered with moss or peat to the average depth of about 10 feet, I was anxious to clear it in the speediest manner possible. As I had not a command of water, it was evident the only way in which I could obtain a constant supply, would be by pumping it from the river by means of a steam-engine. I knew the

quantity of moss which a man ought to clear in a given time, and had only to determine whether an engine of a certain size could throw up a sufficient quantity of water to keep such a number of men employed, as would give me a fair remuneration for the money laid out. On consulting my friend Mr Smith of Deanston, a gentleman to whom I am indebted for advice and assistance on many other occasions, I found that I should not be a loser by the speculation.

Accordingly, in the winter of 1827, I had an engine of ten horse' power put up by Mr Cook of Glasgow, which we calculated would raise sufficient water, with the assistance of a dam large enough to contain the water thrown up by the engine during the night, to keep 25 men at work. The water is raised to a height of 38 feet from the average surface of the river to the top of the moss, and the engine throws up 5 tons per minute. The distance from the banks of the river, where the engine was put up, to the top of the moss, where the water had to be conducted, was 400 yards. The water was conveyed by wooden pipes, made like a barrel, with iron-hoops, 14 inches separate, each pipe being 21 feet in length, and tapering a little towards one end, so that the small end of the one entered the large end of the other about 6 inches. The battens of which they were made were an inch and a half thick, and were of American timber; but having afterwards had occasion to make 700 yards more, I used Scots fir, which answered as well, and was less expensive, the pipes made of it costing only 3s. 8d. per yard, while those made of American wood cost 6s. 8d.

It was first attempted to conduct the water in a direct line from the discharging pipe of the engine to the top of the moss; but it was soon found that the pressure, together with the concussion caused by the stroke of the engine, was too great for the strength of the pipes, and caused the hoops to burst. I therefore caused a cistern to be put up 15 feet immediately above the discharging pipe, close to the back of the

engine-house; a cast-iron knee was joined to the discharging-pipe, and a wooden pipe, with battens 3 inches thick, and strong iron-hoops, was placed perpendicularly in the socket of the knee, the upper end entering the bottom of the cistern. Another perpendicular pipe was placed in the same manner close to it, to allow the water to escape when pumped into the cistern, the lower end entering the horizontal pipes which conducted the water to the top of the moss. This answered the purpose completely, the bottom of the cistern being one foot higher than the top of the moss, so that the water ran smoothly along, and we were never afterwards troubled by the bursting of pipes.

Another difficulty occurred. The mouth of the well into which the rose of the suction-pipe entered, having been made a great deal too small, the consequence was, that the suction from the river drew the moss which was continually floating down towards it, so that the iron-grating, placed at the mouth of the well, for the purpose of keeping it out, was soon choked to such a degree that the water could not enter. This was obviated at the suggestion of Mr Smith, by making the grating 20 feet instead of 6 feet in length.

In the beginning of May 1828 we fairly started, and from that time until the whole was cleared, we met with no material impediment, excepting the very hard frost of 1831, when the river was frozen over, and the levels blocked up with snow. The engine working 20 hours in the 24, was found to supply sufficient water to keep from 30 to 35 men at work. Mr Macqueen, tenant on the farm of Arnive, undertook the management of the work, and to his practical skill and activity I am greatly indebted for the celerity with which it has been done. Next year (1832) I expect that nearly the whole 130 acres will be under crop. Indeed, if there had not been so much rain last summer, as to prevent the burning of what remained of the moss, which was necessary to be done before

the land could be ploughed, the greater part of it would have been under crop this year.

Of the method of clearing away moss I need say little, as it is generally well known in this part of the country; and persons not acquainted with it will get more information by seeing the work going on, than they could from any description. The most important point is to have the command of the water in all directions, without being obliged to cut deep dry levels. It is much better to have too few than too many men; for, in the latter case, the levels are often choked up, and the men thus thrown idle for a time. It is of great consequence to have as straight and short a main-level as possible; but should there be a necessity for having it otherwise, a man should be kept walking along it, in order to keep it clear. When a main-level is first used, great care should be taken to have it of a proper depth, and at the place where it discharges itself into the river, it should be lined with boards, to prevent it from cutting too deep.

The men should always, if possible, be worked against each other. When the levels have been sufficiently deepened, and the floating is about to commence, the manager, who should be the contractor, should pace off each man's portion, marking it with his spade as he goes along. The men should then range themselves on each side of the level, opposite to each other, a steady worker, who can be depended on, taking the lead, so that, if any do not work as they ought, they are left behind. When there is plenty of water, two levels can be deepened at the same time, and half of the men worked against the other. I found this to expedite the work amazingly. At one time half of the men were Irish, the other half Scots. When the strife of rivalry commenced, heroic deeds were achieved, and I thought my heroes were much better employed than others of more renown; for mine were making food for men, while they were making men food for worms. On such occasions, however, the men throw in such large

pieces, that it is difficult to keep the level clear, and nobody is willing to leave his place to assist in removing obstructions; but if the manager be an active fellow, and keep his men in proper discipline, he will be able to manage this matter. The best proportion for each man is four paces, and the breadth to be cleared from the edge of the level should not exceed six feet.

The following is a statement of the expense of clearing 100 acres, averaging 10 feet deep :—

To the contractor for clearing,	L. 2095	0	0
1681 tons coals, at 10s., and 9s. 6d. carriage included,	816	0	0
Wages of engineer and furnace-man,	223	4	0
Tallow, oil, leather, &c.	156	0	0
	L. 3290	4	0

Of course there are other expenses ; but they vary according to localities. I was unfortunate in this respect, for I had to bring the water from one moss to another, a distance of 700 yards, in pipes, which cost me about L. 140. I had also to carry it over a hollow in the moss, by banking, and placing wooden troughs on the top, for an extent of 200 yards, which cost me nearly L. 100. The price of the engine also fell heavy on me, as I had so small a quantity of moss to clear. But these are circumstances which can be calculated upon before the work is begun. Notwithstanding all my disadvantages, I shall have the land for less than half its value. It is true, the land was mine before, but then it never yielded a farthing of rent, and did a great deal of injury to the surrounding land, by keeping it in a damp state. Besides, the existence of so ugly an object in the midst of my property was exceedingly disagreeable. However, ugly as it was, I wish I had a thousand acres more of it, and I should soon have enough cleared to pay the expense of the remainder.

The great advantage of being supplied with water by

steam, is the constant and steady supply it affords. To the west and east of this, on the banks of the Forth, there are several thousands of acres, the proprietors of which would do well to adopt my plan of clearing. Those to the west are farther from coals than I am ; but there is no doubt that good black peat would answer the purpose. If this kind of fuel is to be used, I believe the bottom of the boiler, as well as the furnace, ought to be made longer than it should otherwise be.

The dams for holding the night-water covered nearly the extent of an acre, and held about ten hours' water ; the bottom being of black moss. There is no use in making them too deep, for in that case the water cannot be taken out of the bottom, unless when the people are working close to it, and on the low moss.

MEIKLEWOOD, 7th October 1831.

DIRECTIONS FOR MAKING CHEESE RESEMBLING THAT OF GLOUCESTER OR WILTSHIRE. *By P. MILLER, Esq. Dalswinton. Communicated in a Letter to the Secretary.*

CHEESEMAKING appears to me to have received less improvement than most other branches of our agriculture. The large quantities of milk, far superior in quality to that of England, which are converted, in Scotland, to very inferior cheese, for want of proper method in the manufacture, shew the necessity of a more careful attention to this department of our rural economy ; and if the rules which I now have the honour of submitting to the consideration of the Society were carefully and accurately followed, I have no doubt they would enable others to obtain the same success which I have myself derived from the practice inculcated by them. They are partly derived from personal observation of the method em-

ployed in Wiltshire, and partly compiled from some of the best authors on the subject.

Preparation of the Rennet, or Thickening.—First, procure a well dried maw. Secondly, take two handfuls of sweet-briar and bramble leaves, which boil in four and a half quarts of water, with three handfuls of salt, for a quarter of an hour. Then strain off the liquor into an earthen vessel, and when it is completely cooled, put the maw into it, and allow it to remain until it is fit for use, when it is to be strained and bottled. Some cheesemakers stick a quarter of an ounce of cloves into a good lemon, which they then put into the same vessel with the above preparation. Drip the maw, and resalt it, as it may again be employed in the same way.

This preparation of the maw, in the cheese counties of England, is supposed to correct the rankness of the milk in rich pastures; and every dairy-maid employs her own favourite herbs, which it is pretended prevent the cheese from hoving or bursting in drying, although their sole effect is probably to obviate the bad flavour derived from the maw.

Coagulation of the Milk.—This operation is performed at or a little below the natural heat of the milk, from 85° to 90° of Fahrenheit's thermometer being found to answer best. A period of from one to two hours appears to be the proper time for the coagulation taking place.

It is here proper to observe, that, in small dairies, where there is not enough of milk to make a cheese at once, the milk obtained at night is to be carefully strained, and set apart till next morning, when it is to be warmed to the above temperature, and put entire (that is, without being deprived of the smallest portion of its cream) into the tub, to be thickened along with that which has just been milked. The mode of heating deserves particular attention, as when not duly attended to, it is apt to spoil the cheese, or, at least,

greatly to deteriorate it. The mode which I have caused to be adopted in my dairy for heating the milk of the previous evening, is to have a pot of water brought to the boiling temperature by the time it is wanted in the morning. The cold milk is poured into a tin pail, which is then placed in the boiling water, and kept there until the contents, which are from time to time stirred with a stick, have reached 86° or 87°, when it is withdrawn. In this manner, the cream does not run the risk of being liquefied and converted into oil, which it does when it is suddenly raised to a high temperature,—in which case, it does not remain in the curd, but runs off along with the whey, and leaves the cheese of inferior quality.

The milk should be covered with a cloth while the thickening is going on, so that it may lose only about five or six degrees of its natural heat. If it be too hot, or too cold, at this period, there will be a diminution of the quantity of the curd; in the former case, the curd will be tough and gluey, and in the latter it will be too tender. Should it be too hot, add a little cold spring water; and in the case of its being too cold, heat a milk-bowl in hot water, and put it, with the mouth downwards, among the milk.

Preparation of the Curd.—When the coagulation is completed, the curd is to be thoroughly broken, and the whey carefully pressed out of it with the skimming dish, and completely drained off. The dairy-woman is then to break down the curd very small with her hands. In this part of the operation, a small quantity of salt is, in some dairies, sprinkled over it, and intimately mixed with it; but it is better to salt the cheese through the skin, after it is made, as the action of the salt, in the former case, appears to impair the richness of the curd.

In Gloucestershire, the curd, after being broken down to the requisite fineness, is scalded or washed in the coagulating-

tub, by pouring upon it a quantity of hot whey, or water and whey. Soft curd is to be washed with hot whey, and hard with colder. The whole is then to be briskly stirred, and allowed to stand for some time, until the curd subsides, when the liquor is taken off, and the curd pressed, so as to remove from it as much whey as possible. The curd is then put into the chessel or vat in the ordinary way, and a very light weight upon it. If a heavy weight is applied in this state, or even at any period before the curd has acquired consistency, much of the rich particles of the cheese will be pressed out. The pressure must therefore be gradually applied to the new cheese, and augmented as the latter acquires solidity. At the same time, the other extreme must be carefully avoided; for, should the pressure be too light, the cheese runs the risk of hoving and bursting in the drying.

When the new cheese is at first put into the chessel, it should be perforated through the holes in the vat with a skewer, to allow the whey to run off. As soon as the whey ceases to run freely, and only falls in drops, which will be the case in about two hours, the cheese is to be taken out of the vat, and the curd broken a second time, and again put into the chessel, with a clean cloth about it, when the pressure is to be renewed, in order to remove the last remaining drop of whey.

It should get a clean cloth every morning and evening, while in the press, where it is to remain until it ceases to moisten the cloth.

Salting and Drying.—Salting is the next operation. Small cheeses, such as those of Wilts and Gloucester, are merely rubbed with salt every time they are turned in the chessel, which is found to be sufficient for them, and therefore, when taken for the last time from the vat, they are set to dry, without any more salting. But the large cheeses of Cheshire are taken in the chessel, and set in a tub pretty full of brine, in

which they are turned at least once a-day, and allowed to remain for several successive days, after which they are taken out, laid upon a bench, and rubbed with salt, for eight or ten days more.

When cheeses are supposed to be sufficiently salted, they are washed in warm water or whey, and afterwards well dried with a clean cloth. They are then laid on the drying bench. As the skin becomes hard, it must be occasionally scraped neatly with a blunt knife, and then rubbed smartly all over with a bit of butter, to soften it, and prevent it from cracking.

The last operation is to place them in a tub of cold water for an hour or more, till the skin becomes supple, when they are scraped with a blunt knife, the thumb being held against its edge, to prevent it from going too deep. They are now wiped dry, and put in the cheese-room, to remain and ripen till wanted.

NOTE RESPECTING A METHOD OF COMMUNICATING THE FLAVOUR OF NEW TO OLD CHEESE, BY INOCULATION. *Communicated in a Letter to the Secretary by JOHN ROBISON, Esq. Secretary of the Royal Society of Edinburgh.*

IF it be required to communicate to a new cheese the flavour and appearance of an old one, it may be done by the insertion in the new cheese of portions of the old one containing blue mould. The little scoop which is used in taking samples of cheese, is a ready means of performing the operation, by interchanging ten or a dozen of the rolls which it extracts, and placing them so as to disseminate the germ of the blue mould all over the cheese.

A new Stilton cheese treated in this way, and well covered up from the air for a few weeks, becomes thoroughly impreg-

Fig. 2.

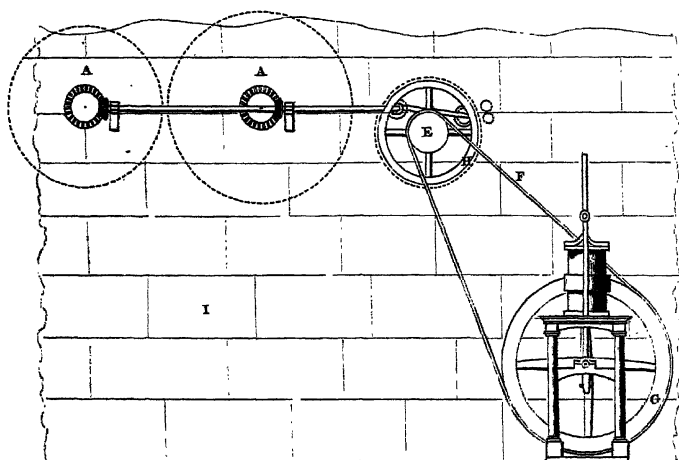


Fig. 1.

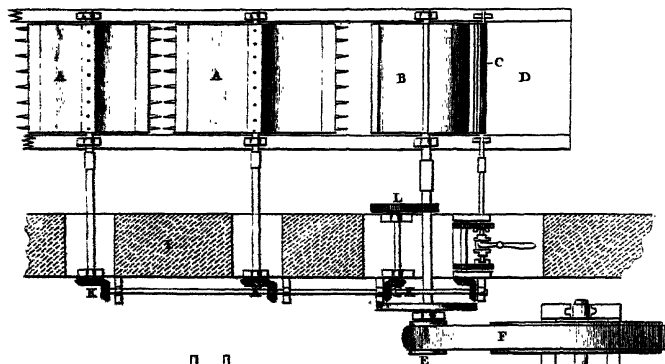
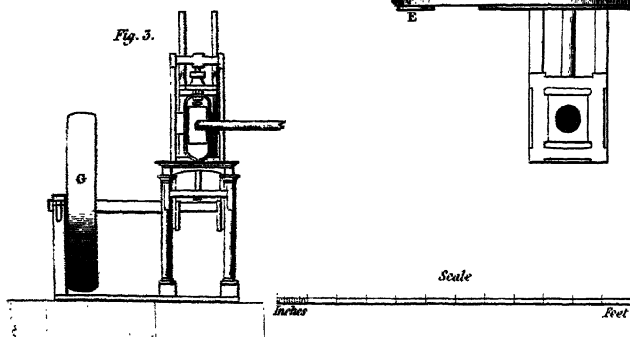


Fig. 3.



nated with the mould, and generally with a flavour hardly to be distinguished from the old one.

In selecting cheeses for this operation, I have chosen them dry, and free from any unpleasant taste; and I have never failed in obtaining a good result, although sometimes, when the old cheese had decayed matter mixed with the blue mould, the flavour and appearance of the inoculated cheese differed a good deal from that of the parent one.

I have sometimes treated half a Lanarkshire cheese in this way, and have left the other half in its natural state; and have been much amused with the remarks of my friends on the striking superiority of the English cheese over the Scots one.

DESCRIPTION OF A NEW MODE OF APPLYING HIGH-PRESSURE STEAM-ENGINES TO THRASHING MACHINES, *invented by Mr BURSTALL, Engineer, Leith.*

THE high importance of the application of steam to the purposes of the arts, need scarcely be mentioned. As yet, however, it has chiefly been employed in facilitating the operations of manufactures, and its application to the purposes of agriculture has been partial and limited. One of these cases has been its application to the thrashing-machine, in which the results have been entirely satisfactory. Hitherto, however, low-pressure engines only have been used. Mr Burstall, the well-known and ingenious engineer at Leith, has been lately engaged in introducing extensively the high-pressure, or rather non-condensing engines. These seem to be superior to the low-pressure engines in various respects: *1st*, Such engines are considerably cheaper in the original cost; *2d*, They do not require more than one-twelfth or twentieth of the water which a condensing-engine requires; and, *3d*, A knowledge of their management is more easily acquired.

They are thus rendered more fit for farm labour, and, when properly made, are certainly as safe as condensing-engines, if not safer ; for it can be proved, that, in this country, where, however, accidents of all kinds are rare, there has been more mischief from the failure of low than of high-pressure boilers.

Mr Burstall's method of applying high-pressure engines to the moving of a thrashing-machine, is extremely simple.

It is well known that there are two methods by which, in mechanics, a slow motion with great power may communicate a rapid motion. The first is by wheels and pinions; the second by means of smooth or iron drums, to which a broad strap adheres by its friction, and conveys the power from the prime mover to the acting agent. In the one case, there is a constant and definite number of teeth acting on each other; in the other case, there is what may be considered as an infinite number of teeth: that is, the surfaces of the belt and drum applied to each other, produce the same result. The use of the belt to drive machinery is of much later date than that of toothed wheels; but it may be safely affirmed, that, where high velocities are required, the former method has considerable advantages, and is gaining ground in the practice of machinery.

Mr Burstall is, we believe, the first who has made the successful attempt to drive the main-drum of a thrashing-machine by the direct application of this principle; and amongst other great advantages of the belt over gearing, is this, that should foreign substances get into the mill, the belt is at once thrown off, and this is all the injury that results, whereas, when, with wheels and pinions, a like accident occurs, an expensive wheel or shaft is generally broken.

For these reasons, Mr Burstall communicates directly the motion to the machinery of a thrashing-mill by means of a belt. The method will be seen from the accompanying Plate. The drawing is made from an old thrashing-mill, formerly

driven by horse-power and gearing, and altered to steam and belts. The machinery for driving the rakes and rollers has been retained, although it is clear, that, as the main machine is well driven by a strap, the subordinate parts, which do not take one-sixth of the power, can be so likewise.

PLATE II.

Fig. 1. is a Ground Plan of a Thrashing-mill, with the Barn-walls, and Steam-engine.

Fig. 2. is the End Elevation of the Steam-engine outside of the Barn-walls in the Engine-house.

Fig. 3. is a Front Elevation of the Steam-engine. The letters of reference are the same in the three figures.

A A, are the Rakes.

B, the Drum and Scutchers.

C, the Feeding Roller.

D, the Feed Table.

E, a Rigger, or smooth drum, fixed upon the end of a shaft that couples to the drum-shaft of the thrashing-mill.

F, is the Belt, from 8 to 10 inches wide, according to the power of the mill.

G, the Fly-wheel of the Steam-engine, lined up with wood, to form a drum for the belt to run upon.

H, the Shafts and Gearing to drive the rakes and rollers.

I, the Barn-wall.

K, the Wheel and Pinion from the Main Shaft.

It is understood that the machines erected by Mr Burstall on this simple principle, have given great satisfaction.

DESCRIPTION OF A' GATE-STOPPER. *Invented by Mr THOMAS RUSSEL, Kirkcaldy Foundry.*

FIG. 1. Is a view of two leaves of a gate, fixed in the pivots at AA. The centre B is formed of two uprights, checked into each other, fixed together by a latch and perpendicular bolt, which is drawn up by the hand. On the gate being opened, one of the uprights A, having communication with a cast-iron box, as represented on the plan Fig. 2., gives motion to the connecting rod between A and B. When the leaves of the gate are opened, the connecting rod is shortened by means of the crank at A; and, when shutting, it is lengthened, pushing an inclined plane or wedge under the stopper, which is thus raised above the surface when the leaves are closed, and depressed when the leaves are opened. The iron-box is intended to be sunk a few inches under ground, and covered with gravel. The posts and gate may be wholly of iron, or of stone and wood.

The advantage of this construction is, that the danger and annoyance resulting from a raised stopper in the middle of a pathway are obviated, for the moment the leaf of the gate is opened, the stopper begins to be lowered, and when the gate is wholly opened, it is level with the ground.

Fig. 1.

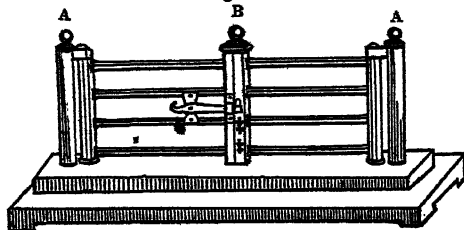
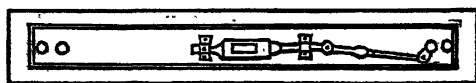


Fig. 2.



ACCOUNT OF THE CARSE OF GOWRIE. *By Mr ARCHIBALD
GORRIE, Annat Garden, Perthshire.*

THE Carse of Gowrie, properly so called, extends from the western extremity of Kinnoul Hill, eastwards to Invergowrie, having a length of about eighteen miles. It varies from half a mile to four miles in breadth ; and is bounded laterally, on the south, by the River Tay, and on the north, by gently rising ground, named the Braes of the Carse. These Braes, extending from Kinfauns on the west, to Lundie on the east, have an average breadth of about a mile of cultivated land. Northward, from the highest part of this rising ground, a moor extends from Kinnoul Hill as far to the east as Pitmiddle, having several cultivated spots and some patches of plantation interspersed. The uncultivated part of this moor measures about eight square miles, the plantations upon it not amounting to more than one square mile. Making allowance for ground occupied by roads, plantations, orchards and parks, there remain, in the cultivated part of the district, about 56 square miles under the plough, and occupied on lease by farmers.

The low Carse has an elevation of from 26 to 40 feet above the level of the sea. A ridge, the highest part of which is about 130 feet above the sea, commences at Pitfour, and terminates at Errol, gradually rising as it proceeds eastward. It is about three miles in length, and runs parallel to, and about three miles from, the river. A ridge of similar elevation commences about six miles to the north and east of the former, running from near Rossie Priory eastward to near Invergowrie. Besides these principal ridges, there are several eminences of less elevation, named Inches (or Islands) ; such as Inchyra, Inchconans, Megginch, Inchmichael, and Inchtire. Near the bottom of the " Braes," a level tract, varying in breadth and composed chiefly of mossy soil, runs from below Balthay-

ack, eastward to Invergowrie. This tract is supposed by some to have at a very remote period formed the bed of the Tay; but no record exists of sufficient authority to confirm this opinion, although the appearance of the tract, and the names of some places along it, implying a connection with shipping, render it not improbable.

Soil.—A strong, fertile clay extends from the west end of the low Carse to the east of Pitfour Castle. Near the river, a considerable breadth of very rich alluvial land has lately been obtained by embanking. The ground rises to the east of Pitfour, and the surface there is a light sandy loam, on a bottom of ferruginous clay, interspersed in some places with fields of light sandy loam, falling northward to near the ordinary level of the Carse. This kind of soil, however, is of limited extent. Near the river, the soil continues, for the most part, a rich fertile clay.

A poor sandy, ferruginous clay soil commences to the east of Glendoig, and extends about two miles eastward, having an average breadth of about a mile. The summit of the ridge near Errol is covered by a black loam enriched by long culture, and lying on a clayey subsoil. A fertile clay forms the soil towards the river, and some fields on the Inches have a surface of strong black loam. At Inchtute, and between that village and Long Forgan, the soil partakes of the colour of the red sandstone, on which it rests. To the east of Forgan, the summit of the ridge is a moorish soil, on a retentive subsoil, while the declivities, on either side, are more fertile. In many places, along the side of the river, a stratum of sand, and occasionally a layer of peat, covered by beds of clay of various depths, are observed. Near the "Braes," where antiquarians fix the ancient bed of the Tay, a line of peat, from 2 to 6 chains in breadth, and interrupted at short intervals, extends from the Den of Balthayack to Invergowrie. With the exceptions mentioned, the soil of the low Carse is a rich clay.

The soil of the Braes is more uniform. A strong black loam, varying in depth from a few inches to ten feet, lying upon limestone or greenstone, and enriched by long culture, forms the soil of the lower parts. As the ground rises, the soil becomes lighter; but even at the summit, where the elevation is from 500 to 600 feet above the Carse, a light black loam forms the greater part of the soil.

Population.—According to the census of 1821, the population in the parishes of Kinfauns, St Madoes, Errol, Kilspindie, Kinnaird, Inchtute, Long Forgan, Liff and Benvie, and Foulis Easter, amounted to 10,727, composing 2237 families; of which 713 are said to be chiefly employed in agriculture, 1140 in trade, manufactures, or handicrafts, there remaining 484 not comprised in either of these classes. The correctness of this statement, however, is questionable. In Kinfauns, of which the population is 802, the families not included in the lists of what political economists call the “productive classes,” are stated to amount only to 7. In St Madoes, which has a population of 331, the families of the unproductive classes amount only to 3, being, it may be presumed, those of the Laird, the Minister, and the Schoolmaster. In Kilspindie, where the population is 722, 28 families are not included in the agricultural, trading, or mechanical classes; and the other parishes are stated to have the unproductive families in the same ratio. Taking the whole resident population, there appears to be about $3\frac{3}{8}$ acres of arable land, and nearly half an acre of moor pasture, for every individual, man, woman, or child, belonging to the district. It follows that much of the agricultural produce of this fertile tract of land must be carried to a distant market.

Country Seats and Parks.—There are in the district about twenty seats of noblemen and gentlemen, respecting which it may be remarked, that although many of them are elegant

structures, substantiality is the ruling fashion. The soil is too valuable to admit of extensive demesnes being attached to the seats. Even the lawns of the most wealthy proprietors are of limited extent, compared with those in other parts of the country, where the rents are much lower. A few of the parks are laid out with considerable taste, but there is in general much scope for improvement by the landscape gardener.

Farm Houses and Offices.—There are few districts in Britain where there is so much wealth, with so little ostentatious display in the external appearance of farm-houses. The farmer who pays a rent of from L. 1000 to L. 1500 is content to live in a plain house, about 40 feet in length by 20 in breadth, divided into commodious apartments, with a kitchen and milk-closet appended at the back. Excepting in a few recently built houses, there is no attempt at external architectural embellishment. The dwelling houses are generally built with stone and lime, the office-houses not unfrequently with clay; and the latter are thatched with reeds, which is also the case with some of the dwelling-houses, although they are more frequently slated. Formerly grey slate was much used, but the heavy and clumsy roof which it formed is giving place to the lighter one of blue slate. The thrashing mills are of the most approved construction, and are from two to six horse power according to the size of the farm. Few of them go by water, and none by steam.

Size of Farms.—At a period not very remote, a great part of the lands in the Carse of Gowrie was let in leases having the same duration as the life of the tenant. This practice, however, is now given up, and the leases are of nineteen years. The farms vary exceedingly in size, having an extent of from 40 to 400 acres. On clay land, a pair of horses are requisite for every 30 acres, and on black land for every 40 acres, of the arm.

Rent.—During the late war, when high prices were obtained for agricultural produce, a keen competition in farm-taking was excited, in consequence of which land rose in value with unprecedented rapidity. On the return of peace, the farmers found themselves unable to fulfil their engagements, and the deduction of rent which necessarily followed induced adventurers to get possession of land at any rate, trusting to the liberality of the landlords. This contributed in no small degree to injure the farming interest. The rent of land was for the most part paid in money, with half a boll of wheat and the same quantity of barley per acre. When tenants became clamorous, many of the more considerate landlords reduced the money part of the rent to the rate of the county fiars for wheat, barley and oats, and thus insured a moderately high price for such grain to the tenants, while they got the value of their land by the annual average price of grain. Wherever this conversion has taken place, the farmer goes on with confidence; but where the old system of paying the greater part in money, without reference to existing prices, still continues, a disastrous season sends the farmer as a petitioner to the landlord, who is often obliged to listen to his tale of distress.

During the war, land let as high as from L.3 to L.3, 10s., together with half a boll of wheat, and as much barley, per acre. In some instances, more was promised. Land has since fallen in rent from 10s. to L.1 per acre, and even under these circumstances, the farmer has found it difficult to keep free of arrears during the last three years, the wheat suffering from the depredations of a species of insect.

Crops.—The grain on which the Carse farmer chiefly places his reliance is wheat. The clays produce luxuriant crops of beans. Barley, though perhaps not always so plentiful a crop on clay as on more easy land, is of excellent quality. Oats are less cultivated in the low Carse than any of the other species of grain; but, on the Braes, they occupy a greater breadth than

either wheat or barley, particularly near the summit. There, too, potatoes and turnips are cultivated on the fallow division, which cannot be done successfully to any extent on clay lands. The general rotation of crops in both cases prescribed by the lease is, 1. Fallow, or on black land fallow or drill crop, such as turnips or potatoes; 2. Wheat; 3. Beans on clay, and pease on black land; 4. Where dung can be spared, part of this may be followed by wheat, and part by barley, with grass seeds; 5. Grass; 6. Oats, or part wheat, with dung. On clay lands a seven course shift, and on the higher parts of the Braes a five course shift, are sometimes permitted, as they are found, by admitting two white crops in succession, to be more favourable to the growth of clover, of which the land is, in many instances, evidently sick; but as cross-cropping is reckoned bad farming, these modes are only tolerated, and are seldom admitted as conditions of the lease.

Horses and Cattle.—The great quantity of labour which, in this district, it is necessary to perform by horses, has always directed attention to the breeding and rearing of these animals. By the exertions of the Carse of Gowrie Agricultural Society, these objects have been greatly forwarded of late years. Although the nature of the district renders the rearing of cattle less profitable than the production of grain, some specimens of the most approved breeds have been produced, which would have done credit to the most eminent breeders of the south. On the Braes of the Carse, breeding and rearing of cattle might be conducted more advantageously, and to a greater extent, than at present, were the higher part of the ground enclosed and properly sheltered by slips of planting. The number of draught horses employed in agriculture, in the district, may amount to 2500. The milch cows are hardly so numerous.

Roads.—About forty years ago, the turnpike road from Perth to Dundee was formed along the middle of the low Carse. Of the other roads, one runs along the bottom of the

Braes, another near the river, and nearly parallel to the great turnpike road. They are all intersected by roads which lead northward, across the rising ground, to join the Cupar-Angus Road, and to the principal shipping ports on the Tay. The turnpike road and the branches leading to the different ports, have lately been macadamised, and are at present in the most perfect condition.

Drains.—In a level tract, like the low Carse, it was impossible to extend field culture, without main leading drains, or as they are locally termed Pows, to carry off the water issuing from the different glens and hollows that intersect the Braes, together with the surface and spring water accumulated in the low Carse. Accordingly, at an early period, such drains were opened where necessary, and baronial regulations were entered into by contiguous proprietors for keeping them clear, which the interest of each binds him to observe and enforce ; but the occasional floodings to which much of the land adjacent to these main drains is liable, shew that they are not fully adequate to the purpose intended.

On impervious subsoil, it is necessary to cut drains near each other, to render them effective. Wedge-draining, therefore, is one of the most important improvements lately introduced in the culture of carse lands. The humidity and level nature of the ground render it necessary, in many instances, to continue the high-crowned, broad, curvilinear ridges of old times, and a wedge-drain in each of these furrows is attended with much advantage. When, about six years ago, these drains were first introduced into the Carse of Gowrie, clods obtained from the surface were employed for filling them ; but these were soon found to be inefficient, and stones are now used, although in some instances, wood has been resorted to.

Woods and Plantations.—In the low Carse, there is little sylvan scenery. A few beeches and other deciduous trees of

moderate size, are to be seen in several parks, and some of the red-twigged variety of the Huntingdon willow (*Salix alba*, Lin.) stand on the margins of open drains. The latter, having been left to nature, have their boles short, and their tops mere masses of useless spray. Although there are no hedges, there are several lines of what may be termed hedge-row trees, which, however, are, with very few exceptions, a disgrace to the country. Many are ill suited to the land in which they are planted, and as little attention has been paid to pruning or training, they have become mere bushes, hurtful to the land by their roots, and of no use whatever. Scots fir seems to prosper on some of the poorest humid clays, and does not exhibit symptoms of decay at so early a period as where the soil is lighter, drier, and of such a nature as is generally considered more congenial to that tree.

On the Braes, a beautiful specimen of well-grouped trees is to be seen to the east of Kinfauns Castle, where ample justice is done to the fine natural scenery of the place. Masses of wood occur on several steep declivities on other estates, and there are some young plantations which may be said to be thriving; but, on the whole, there is a decided want of wooded effect on these fertile and beautiful banks.

Orchards.—In the Carse and Braes of Gowrie, there are about thirty-seven old orchards, covering an area of about 156 acres. In some of the oldest are many varieties of pears and apples, which had probably been raised from seed during the monkish ages, and of which many have not yet found their way beyond the spot where they originated. A few have of late been brought into notice as deserving of culture, such as the Flower of Monorgan, Gold Knap of Gourdiehill, Busked Lady and Pow-Meg of Port-Allan pears, the Bullastrae Hill, Green Virgin, Monypenny and Cluster pippin of Bogmill, and Pow Captain of Port Allan apples. Besides the above area under old orchards, from 30 to 35 acres have been re-

cently planted, and more attention is now paid to rearing and managing fruit-trees than formerly.

The fruit is for the most part sold by auction to contractors, who find a market in Dundee, where other fruit-dealers purchase pears and apples for Arbroath, Forfar and Montrose.

Horticulture is usually an accompaniment of wealth and refinement, and in the Carse of Gowrie this art meets with ample encouragement. Within the last twenty-five years, five new excellent walled gardens have been formed, and several forcing-houses have recently been erected in the older gardens. Horticulturul societies have been established in Perth and Dundee, and the emulation thus excited at each end of the Carse has been the means of introducing improved varieties of fruit, flowers, and vegetables.

Varieties of Grain and Vegetables.—The varieties of Wheat usually cultivated are the common or white wheat, which is the prevalent kind; the common red wheat, cultivated very partially; the golden wheat, a variety lately raised by one of the most enterprising farmers in the country, James Hunter Esq. of Templehall; Talavera wheat, sparingly cultivated; together with some unimportant varieties. Of the varieties of Oats, the Grange or Angus oat is the most common, and is a good old late variety. The Drummond oat, a variety which originated in the Carse of Gowrie, is also a good late variety, and is preferred by some on strong lands. The potato oat, an early variety, the red early oat, and the Friesland oat, are also cultivated. The Georgian oat has had a trial, but is losing ground. The Hopetoun oat, which was introduced last spring, promises well. There are few varieties of Barley cultivated. The English two-rowed is the most common, and of this there is at least one subvariety, which yields a plumper grain under the same circumstances. The Scotch two-rowed variety, which is said to be longer in the straw, and a little earlier, than the English, is also cultivated. Naked

barley was introduced last season, and promises well. Bear or Big is not cultivated.

Of Beans one variety only has hitherto been generally cultivated. Winter beans have been tried, and are still on trial, on a small scale. Of Pease the only field varieties are the Early Hasting, a greenish pea; the partridge pea, a mottled early variety; a white pea with black edge, sparingly cultivated; and the grey pea, a late variety, usually sown partially amongst beans, and which is the most common.

Of the Potato, the Shannal Red is the variety principally cultivated in the fields. It was introduced in 1807; and although at first it could hardly find a market in Perth or Dundee, it has now become an article of export for the London market.

The varieties of field Turnip are more numerous: the globe, red-topped and green-topped are the most common. The Aberdeen yellow is a favourite, and is given by some to horses as a substitute for potatoes. Swedish turnips are little cultivated, although a brown-topped variety has lately been introduced from East Lothian, where it is a favourite. A long-rooted yellow, and a white turnip of similar shape, growing all below the ground, and of a firm texture, have lately been introduced from Germany, and although less bulky than some other sorts, may contain as much nutritive matter, and will be less liable to be injured by severe frost.

Of the native plants, the most useful is the Reed (*Arundo Phragmites*). It grows abundantly and luxuriantly by the river, where the ground is still too moist for culture. It is cut in winter, and sold for thatch in bundles at from 25s. to 30s. per hundred, each bundle being nearly a foot in diameter. A roof of this material, if well put on, is supposed to last nearly two nineteen years' leases, with little repair.

Improvements.—Iron ploughs are now extensively used, and some harrows of the same material may be seen in the

district. The construction of the plough is excellent, but the desire of having neatly edged furrows often induces the ploughman to set his coulter too deep. This adds greatly to the draught, and, after all, the beauty or utility of a nicely cut angle on the upper part of the furrow is more imaginary than real.

On clayey lands, when dry spring and summer weather succeeds excessive moisture in winter, the land becomes hard and cloddy, and requires vast labour to produce a mould by the common plough, roller and harrow. It is, therefore, surprising that a roller with iron cutters has not long ago been introduced. On the lighter soils, toward the summit of the Braes, a grubber, or Finlayson's harrow, would be a valuable instrument for cleaning the ground, in little time, and with few ploughings.

The reaping machine has been tried, and does its work well; and though it will not prevent the necessity of hand labour, by the inhabitants of cultivated districts, it may render the assistance of strangers less necessary.

A great breadth of the land near the lower part of the Braes, or north side of the level ground, would be much improved, were the pows or main drains cut considerably deeper, so as to prevent flooding or stagnant water. Wedge-drains might in some instances, where stones or wood are scarce, be profitably filled with tiles or rude bricks, made of the clay in the field. The removal of the duty on the material would follow a proper application to Government, under such restrictions as might save the revenue from loss by its abuse.

Of woods and plantations more might be said with advantage than the limits of this essay will admit. Oak is the tree that should be cultivated in rows along the borders of fields in the low Carse, as it sends its roots deeper in search of food than oats or other annual crops. Elm and ash are highly injurious to surface soil, and beech is not worth rearing, nor is clay land suitable to it. The oak should be trained on the most approved principles; and, if extensively planted,

protected and properly managed, it would prove useful as well as ornamental.

On the higher grounds to the north of the Carse, nothing would remunerate a spirited landlord better in the way of agricultural improvement, than laying out the ground in regular parks, with intervening slips of planting, where necessary for shelter. The softer lands would thus occasionally be profitably laid under pasture, in order to acquire consistence, the climate would be improved, and an important feature would be added to the landscape.

The only improvement which I would suggest in the orchard department, is a little more attention to training. The bell shape of former times cannot be produced on old trees, for which reason they are totally neglected. Although high authority is against the practice, it accords with experience to recommend training in the style which the French call *en pyramide*. According to this method, the under shoots or branches are always largest, the lateral branches are in open order, and bear fruit in towards the stem of the tree as well as at the end of the shoots; there is at or near the centre a main leader, with which no other aspiring shoot should be allowed to contend; and no shoot should be permitted to overtop or reach in length its inferiors. By a little attention, this natural and easy shape may be given to any variety of fruit-tree. The fruit-bearing surface will be much extended, and the tree will become more lofty, and at the same time much more secure under shaking winds. Plums are a desideratum in the district, and their introduction must precede a taste in the neighbourhood for their use.

On clay lands, the application of unfermented manure tends to keep open and pulverize the soil, as bone-dust is not effectual on such lands. It would add to the stock of manure to cultivate the *Poa aquatica* on such swamps as are not occupied by the reed. This plant affords a great weight and bulk of good litter, and, in some cases, might be useful as winter fodder.

Some of the lately introduced Mulleins (*Verbascum*), which are of large growth and foliage, might be planted in waste corners on the Braes, to be ploughed in as green manure for turnips in June, and wheat in autumn. *Symphytum asperrimum* is assuredly liked by horses and cattle, and will soon recommend itself to the cottager and dairyman, as a powerful auxiliary to clover, in the summer and autumn.

While agriculturists in this quarter are attending so successfully to the rearing of cattle, they ought to recollect that the Carse of Gowrie is a corn district, and that rearing new varieties of corn might be attended with incalculable advantage. The process is easy, and the result not distant. A second or third year proves the merits or demerits of annual plants. The success obtained by horticulturists in this way, within the last twenty years, is almost incredible. About 1200 varieties of apples, and 600 varieties of pears, are already in one collection in the island, many of which required from ten to fifteen years before their nature could be ascertained. Vegetables and flowers have repaid similar care with similar success. In the field, however, the limited variety of cultivated grain affords little choice, and here there is much room and much necessity for improvement. A single half-hour spent in divesting the flower of the oat, the wheat, or the barley, of its unopened anthers, and bringing the stigma in contact with the pollen of another variety, might produce several hybrids superior to those now in cultivation. In this manner, varieties of corn may yet crown our fields, as superior to those now in use as the cauliflower, the savoy, or the sugar-loaf cabbage are superior to their original, the *Brassica oleracea*, a miserable looking weed which grows on the cliffs of our southern shores. A variety of wheat, which does not seem liable to the attacks of the wheat-fly, has been accidentally found. It is most prolific, grows a foot taller than the common wheat, but is not like the Revet wheat. It is awned, and somewhat like the Egyptian, but of a clearer colour, and without the protuberan-

ces of the latter. If once a supply of this variety for seed is found, the fly will be starved. Of a patch standing in the middle of a field, where every ear of the common wheat was hurt, and where flies were very numerous, not an ear was touched, although other bearded varieties suffered.

Some excellent land has lately been gained from the river, and a great quantity still remains to reward future exertions. Much waste moorland beyond the summit of the Braes might also be cultivated with advantage to the proprietor, the labourer, and the climate.

ON THE CULTURE OF THE POTATO. *By Sir GEORGE S.
MACKENZIE of Coul, Bart.*

THE supposition that we know all that can be known of those things which daily present themselves to our view, or which are common, is a very general error, and one that has greatly retarded the progress of useful knowledge. The Scottish wiseacre who informed a young inquirer, that the three great points in husbandry were, 1st, muck; 2d, muck; 3d, muck (*Anglice* dung); was unquestionably right so far, that dung is a *sine qua non*; but he was wrong in despising what may be called refinements in agriculture. Many of those are certainly questionable in point of utility; but attention to them produces that sort of business-like neatness, which is a sure indication that greater matters are understood and not neglected. We all know that muck will make vegetables luxuriant; but as we do not observe that nature feeds her children too richly, we must take care not to cloy them, lest we alter their habits too much, and incapacitate them for production. Perhaps there is no plant which illustrates this more strikingly than the potato. Give it a moderate supply of manure, and

it produces largely ; plant it on a dunghil and it produces nothing.

Much has been written respecting this most valuable plant, and a good deal but little to the purpose. This and that nostrum have been proclaimed, tried, and found of no avail ; and there has appeared, both in agriculture and horticulture, a strange propensity to give the colour of science to quackery.

The first thing to be inquired into, when we desire to discover the best method of cultivating a plant, is the habit and properties which nature has given to it. A plant that climbs will not grow so well if left without support ; nor will one that trails thrive, if it be forced into the position of a climber. An aquatic will not live in dry sand, nor will bent-grass survive in a ditch. There are soils in which, generally speaking, the potato will succeed better than in others ; and if its habits be observed, it will be found that, with a little help from the three points of good husbandry, without dusting the sets with gypsum, or applying any nostrum, or going out of the way at all, its cultivation may be rendered a very simple matter.

Like some other plants, the potato *sports*, as gardeners say, that is, the seeds produce varieties different from the parent. This fact enables us to overcome difficulties ; for it is found that a potato having desirable qualities in one situation, loses them when transferred to another soil ; and one that is indifferent in one place, may improve in another. Some varieties are excellent during the winter, and become bad in spring ; some are best in the latter season, and others are good during both seasons, and keep good till July, or even later, with proper care. If a farmer cannot find a potato adapted for the soil of his farm, he has nothing to do but to begin to raise new varieties from seed, and to go on until he obtains a variety possessing the desired qualities. Having had to deal with hundreds of varieties (and it is possible we may at some future time talk of thousands), we feel at li-

berty to affirm, that although change of soil and treatment may improve or deteriorate the quality of the tubers, no circumstances will change the habit of any variety. If it be early, it will not become late; if productive of tubers, it will not become barren; nor will a late sort become early, nor a barren one fruitful.

As a crop of rotation, the potato is of much importance; and as, in attending to it, succeeding crops are looked to, a certain quantity of manure is allotted to the field. Now, instead of regulating the quantity of manure to the necessities of the potato, its natural habit of running into new varieties, fortunately enables us to adapt the potato to the quantity of manure, and to the soil.

When a farmer wishes to select a potato from among those already cultivated, he ought to try as many varieties as he can find, good, bad, and indifferent; but those that have proved good in soil similar to that of his farm are, of course, to be preferred. Change of soil, though it may not alter the appearance of the plant, has a great effect on the quality of the tubers.

When we first began to raise potatoes from seeds, the following qualities and properties were written down as essential to a good potato.

1. *Moderate Size*.—A large size is inconvenient in cooking, and we cannot depend on a large potato being well boiled. Such are also commonly found to be hollow.

2. *Regular Shape*.—The disadvantage of crooked and robbly or hollow-eyed potatoes, is considerable waste in boiling, and a great deal in peeling them.

3. *Roughish Skin*.—We have hitherto found that potatoes, with the cuticle somewhat cracked or scaly, are the heaviest and driest when boiled, and in general earlier than others.

4. *Not bursting when boiled*.—Some varieties have been observed not only to burst, but actually to dissolve in boil-

ing. Simply cracking is no disadvantage; but it is of importance that the skin should remain as entire as possible.

5. *Dryness and Firmness*.—Potatoes with these qualities combined contain the largest quantity of nutritive matter, since people prefer wet, and what are called waxy potatoes, particularly in England. In Scotland, mealy potatoes are generally chosen; and this quality is usually announced by hawkers in the streets of Edinburgh. The two qualities are seldom combined; but the union is very desirable.

6. *Agreeable Taste*.—Any person who has tasted a great variety of potatoes, must be aware of the great difference of effect on the palate. To attempt to describe any taste not one of the simple primitives out of which all others are derived, viz. sweet, sour, bitter, is useless, as it cannot be done*.

7. *Productiveness*.—This is too much attended to, and for its sake other qualities and properties are too much neglected. There should be no hesitation in chusing a moderately productive potato, with good qualities, in preference to one that yields a large return, bad or indifferent. It is very desirable to have productiveness united to other things.

8. *Earliness*.—As it is important to have potato ground cleared for wheat in good time, early ripening is of consequence. Those potatoes which throw out stems the soonest are not commonly the earliest. The eyes of the earliest garden-potato do not push till the season is well advanced. But such potatoes have tubers formed at the root at a very early stage of growth, which rapidly arrive at maturity.

9. *Long Keeping*.—Many varieties may be kept till midsummer, but all of them do not retain their good qualities so

* It is very long since we were of opinion, that there were three primitive colours, blue, red and yellow; three primitive sounds, first, third, and fifth; and three primitive tastes, as above. The other senses may also be thus considered. The function of touch is simple resistance; and this has three species, total, or hardness; partial, elasticity or buoyancy; yielding, or fluidity. To discover primitive smells has defied us.

long. Hence the property of long keeping is to be understood as indicating the preservation of these qualities.

The possibility of obtaining a variety possessing all these, by raising plants from seeds, and to suit any soil, cannot be doubted. There are some soils, however, which seem to be uncongenial to the potato, and it is scarcely an object of culture in such soils. Nevertheless, a trial may be made in every soil; and there is much interest in the attempt. It is strongly recommended to every one who desires to have a fine potato suited to the soil of his farm, to proceed to sow seeds, compare the varieties produced, and persevere till a suitable variety be obtained. The mode of proceeding is as follows. Having procured as many varieties of good potatoes from other places as possible, prepare a piece of ground for them by giving it a moderate supply of manure. Plant one or two sets of each sort within a few inches of each other. By this means the flowers will be near, and the bees will fecundate them by conveying the pollen from one to the other, thus crossing the different sorts. Take the apples when fully ripe, and keep them till spring, when a few seeds may be selected from each apple and tried. In the following spring, prepare as much ground as can be spared, by digging and clearing it of weeds, and mixing a very little dung with it. Make shallow drills at the usual distance of field drills, and drop a single seed at every two feet in the drills. Or two or three seeds may be dropt together; and when they spring, remove all but one plant, and that the earliest. This may be done in March, or about the beginning of April. As the plants grow, draw up the earth around them. It is necessary to keep each plant at a considerable distance from another, in order to preserve the tubers of each variety separate. It has been observed, that when seedling plants grow vigorously, and shew flowers, they rarely form tubers, and are consequently useless. But this is not always the case. The different plants being numbered, the progress of each sort

should be noted, and likewise the time when the leaves begin to decay. This they commonly do later the first than in subsequent years; and frequently they continue to grow until frost nips them down. The tubers of the first year are sometimes very small, and sometimes of considerable size. The shape may be judged of the first year, and sometimes the appearance of the skin, but no other quality or property. Often a seedling is very productive, but falls off the second year.

The seedling tubers having been carefully preserved, are to be planted the following spring, the ground being manured as for field potatoes. If the tubers admit of it, they may be cut into sets; if not, they may be planted entire. The crop is to be treated precisely as an ordinary one. The progress of the plant must be observed, and the time of flowering noted, together with the colour of the flower; and such plants as have barren flowers may be marked. Then let the time be observed when the leaves begin to decay, for then the tubers have got to their full size, and may be taken up. The apples of the earliest may be preserved for a future experiment. The most productive among the earliest varieties may be selected, and the rest thrown away. Each sort may now be tried by boiling and tasting; and those of the kind approved are to be set aside till spring, and again boiled and tasted, and a few of the best may be set aside to ascertain how long they will keep, and the rest planted, in order still farther to ascertain their qualities. Those kept should be looked at occasionally, to ascertain which of them tend to push out shoots at an early period; and these may be rejected, those which are late of shewing a tendency to grow being preferable. The third year will determine which is the best variety, and all the others may be thrown away. There is no *certain* indication of productiveness the first or second year. For example, a seed among many which we had sown happened to come up very late, and produced a single tuber no larger than a walnut. The shape and general appearance pleased us,

and it was planted the following spring, and produced 120 tubers fit for planting. But in the third season it did not prove by any means a very productive variety.

It will be necessary to devote a considerable space of ground for the purpose of raising new varieties, because we have known not more than five or six in a hundred turn out worth planting the third year, sometimes not one of these possessing merit enough to be retained permanently. Like all other experiments, the search for a potato possessing the main points of perfection already enumerated requires patience; but there is much interest in it, and it will afford much amusement if committed to the younger members of a family, with the promise of little premiums for the best sorts, each having a little bit of ground in a corner of a garden.

What are called early potatoes have the habit, not of pushing shoots early, but of producing tubers at an early stage of their growth. The stems, in consequence of the early ripening of the tubers, decay at an early period. Such varieties are also found to produce seed-apples very seldom. We have no very prolific variety of early potato of good quality; and should any person be fortunate enough in producing one, gardeners will be greatly indebted to him. In raising new field varieties, the indication of earliness is the discoloration of the leaves, and if this take place about the beginning of September, it is time enough for wheat sowing. This cannot be judged of the first year with any degree of certainty. As long as the leaves continue green, the tubers are increasing in size; and as soon as they begin to be yellow, the crop may be raised, as the tubers make no progress afterwards. Hence the absurdity of what has been proposed, cutting over the stems before they begin to decay. Every part of a plant is dependent on every other part; and the cutting of the stems has no other effect than giving a tendency to produce fresh ones. An annual plant may be kept-alive for several years, by cutting the stem before the seeds are formed; the *vis vitæ* not

becoming exhausted till the great end of the existence of the plant is accomplished, that of securing a succession of its kind.

It is very generally supposed that the formation of tubers is caused by the roots meeting some slight obstruction in their progress; and some consider tubers as monstrosities. There cannot be a doubt that certain conditions are necessary for the perfect development of all the parts of plants, and it is the object of cultivators to discover these. But in regard to tubers being monstrosities, we differ from that opinion entirely, and regard in them a most benevolent provision for the continuance of individual variety. Did tubers not belong naturally to the plant, this providential mode of continuing the variety would be absent, and the cultivation of the potato would become so uncertain as to lead to its relinquishment. It appears just as reasonable to say that runners are naturally no part of the strawberry plant, which sprouts from seed also, and affords no other means of continuing a variety.

It must now be remarked, that some varieties of the potato succeed best in rich, others in poor land, and some in land moderately rich. But, as already observed, the object is to obtain a variety suited to that degree of richness which is necessary, in a rotation of crops, to suit the crops following the potato.

The time for planting potatoes is generally thrown too late into the spring, and even summer, from a very natural dread of spring frosts. But if attention be paid in preparing the sets, leaving several eyes to each, though the first shoots be nipt, others will follow, and the crop be no worse, nor much later; and it is of much importance to have the potato crop ready for gathering, as soon as the corn harvest is over. In order to have the crop regular both in coming up and in ripening, care should be taken to place the sets with the eyes uppermost.

Thus it appears, that every farmer, if he cannot otherwise procure a potato suitable to the soil he cultivates, has it in

his power to find one by raising new varieties from seed, and noticing their growth, qualities, and properties. Should the recommendation to do this be generally followed, much time will not elapse before good potatoes will be formed every where. There are many prejudices in London and elsewhere, in regard to colour, size and figure, to the total disregard of all other qualities. These prejudices will gradually disappear.

Not a little depends on the cooking of the potato. Some will not bear the cuticle to be taken off before boiling, others seem to be the better for it ; and experience must determine whether they are to be committed to the pot with their jackets on, or stript. Finally ; if one variety cannot soon be found, which shall be good from the time of raising till the summer is well advanced, two varieties may be found, one of which will be good when taken up, and the other in spring, and until early potatoes may be obtained.

Potato flour, boiled with milk, and a little sugar, forms one of the most palatable, wholesome, and cheap dishes of which a labouring man can partake, and cannot be too strongly recommended to cottagers, who ought always to convert a portion of their potato crop into flour, to be used when fresh potatoes cannot be got. The potato in its natural state well boiled, and eaten with milk, is a feast for an Emperor ; and were men to reflect a little more than they do, on the bounty of Nature, they would confess that there is no gift to our mortal part, for which thanks to Nature's God are more called for, among the ample stores provided for His (alas ! ungrateful) creatures.

REMARKS ON THE CULTURE AND UTILITY OF SEVERAL KINDS
OF HOME-GROWN TIMBER, WHICH MIGHT BE USED IN
HOUSE-BUILDING, IN PREFERENCE TO FOREIGN TIMBER.

By Mr ROBERT MONTEATH, King's Forester for Scotland.

THE vast quantities of wood now planted in all parts of Britain, and the care generally employed in rearing it up to maturity, render it of the greatest importance to discover how a consumpt can be got for the over produce, and how the latter can be applied so as to afford the planter a fair remuneration for his trouble.

In every part of the country, plantations are rising so rapidly, that even if we consider them as reared solely with a view to ornament, the thinnings which it is necessary to make from time to time, will afford more wood than can be required in the country; and where extensive tracts are planted for profit, the difficulty will be doubly felt. Large manufacturing towns will necessarily extend their demands over an extensive district; but every village, and even every town of ordinary size, will be amply supplied from its immediate vicinity.

The inconvenience alluded to has already begun to be felt. As a proof of this, I may mention, that a gentleman from Galashiels, who lately travelled with me in the coach to Edinburgh, informed me that, being in the habit of using large quantities of home-grown fir, to the amount of from L. 50 to L. 70 Sterling yearly, he used to drive the greater part of it from Longnewton, but was now abundantly supplied from the plantations in his immediate neighbourhood.

As, in a recent publication, I have advocated the propriety of using larch and other firs, in house-building, I shall here confine my remarks to other kinds of timber trees, which may advantageously be used, not only by the proprietors them-

selves, but also by householders and tradesmen in general, and for which there is at present, in many places, but little demand. The kinds of timber which I have principally in view are oak, ash, elm, Spanish chestnut, beech, lime, and poplar.

The first question that occurs on this subject is, Whether these kinds of wood can be used at less expense than foreign wood? and, in order to obtain a solution of it, it becomes necessary to inquire the prices of both kinds of timber.

The best Memel timber, average of log, plank, and deal, costs 2s. 6d. per cubic foot. The average of Norway log, plank and deal, is 2s. 6d. per cubic foot. The best American timber costs 2s., and common American, 1s. 8d. per foot. These are the prices in the timber-yards after importation; and we may reasonably add 3d. per foot, on each kind, for every ten miles of carriage.

The prices of home-grown timber, on the lands where it is reared, are as follows: Oak, stripped of the bark, 2s. 6d.; elm, 2s.; ash, 2s.; Spanish chestnut, 2s.; beech, 1s. 3d.; lime, 1s. 3d.; and poplar, 1s. 3d. per cubic foot. If we suppose that there is no consumpt for these kinds of wood on the ground where they grow, we may reasonably deduct 3d. per foot, for every ten miles they may have to be driven to market.

Now, we shall suppose that a proprietor has large quantities of these kinds of timber growing on his estate, and that he disposes of it at these prices, or, as often happens, at even inferior prices; for I have seen some of the finest beech that Scotland could produce, sold at from 6d. to 1s. per foot. Is it not absurd that he should dispose of the best wood in the world for building at 1s. 6d. per foot, when he is buying foreign wood, at 2s. 6d. and 3s. per foot (carriage included), for the same purposes, when he might have employed his own wood for his farm-houses, &c. and have saved one-half of his expenditure, and prevented the necessity of rebuilding the same houses in a few years?

The second question is, Are there kinds of home-grown timber more durable than the foreign? It is a well-known fact, that oak, ash, elm, beech, and Spanish chestnut, when employed for any kind of house-work, last for centuries. In some of the oldest houses and castles, of which portions are yet standing, we find joists, floors, couples, &c. entire, although many hundred years old. Witness Castle Campbell, the old castle in Lochaw, Torwood Old House, and many others that could be mentioned, erected above 500 years ago. I have a joiner's plane made from an earth-couple, taken from a low farm-house, built in 1601, and which may yet last 100 years. I have often seen these earth-couples, taken from old houses, made into wheel-spokes and fillies. They were usually placed on the ground, and built into the wall, so that this portion of them had less chance of lasting than the other, which rose above the wall. Many are still to be seen entire, in Argyllshire, in houses, the dates of which cannot be ascertained. No foreign timber can bear the least comparison with these couples of oak, ash, and beech; and, in fact, it is admitted by all that home-grown timber lasts four times as long as any of the foreign kinds usually employed.

We have next to enquire, To what purposes in house-building can these kinds of home-grown timber be most profitably applied? Oak, in former times, was employed for all the purposes in house-building; but, at present, it may be most profitably used for windows, doors, and flooring. It would answer equally for roofing and joisting; but for these uses some of the less valuable kinds are sufficient. Spanish chestnut may be applied to the same purposes as oak; ash and elm are most suitable for joisting and roofing; beech for joisting, flooring, and stairs; lime and poplar for window-shutters, inside doors, sarking, and finishing of all kinds.

That these kinds of timber will answer for the purposes mentioned, none will attempt to deny; but it is difficult to persuade tradesmen to work them. Four principal objections

are urged by them against the use or working of these woods :
1st, The expense of sawing ; *2d*, The difficulty of working ;
3d, The inferior look of British wood in inside finishing ; and,
4th, The greater labour and expense.

1. Foreign fir-wood is sawn from the log into scantlings or deals, at 2s. 6d. per hundred, superficial feet ; and the different kinds of timber, commonly called hard-wood, are sawn from the log into scantlings or deals, at from 4s. 6d. to 5s. per hundred feet, both by manual labour. The difference, however, may be reduced, and the objection to which it gives rise completely obviated, by circular saws, which no proprietor of woods should want on his estate, and by which, sawing of all kinds of timber, and into all sizes, is reduced to a mere trifle.

2. Suppose joisting, roofing, and serking, which are used off the saw, to be prepared by machinery, say by circular saws ; they are managed more accurately in this manner, and require nothing but putting together or nailing down, so that, in this matter, there is rather a saving of workmanship. The remark applies equally to flooring, which, of foreign timber, is generally made from what is called Battens. These are, for the most part, sawn out before they are imported, but they are often very unevenly sawn, so that there is considerable waste in straightening them. Circular saws would completely obviate this, as they cut so exactly as to render very little planing or joining necessary. Besides, flooring-deals or battens are now almost all wrought by machinery, so that the tradesman has merely to lay them down.

3. British hard-wood, it is said, does not make so fine a job in inside finishing, by which are meant doors, window-shutters, and facings or mouldings. Now, in almost all houses, and especially in good houses, these are no sooner finished than they are painted ; in which case, if the wood be durable, it is of little consequence how it looks. But lime and poplar, as I have said, are the kinds best adapted for

these purposes ; and I would ask what kind of timber could make better looking window-shutters and inside doors than lime and white poplar ? Nor could any kind of wood whatever make more beautiful facings or mouldings than good clean lime. I am aware that house-carpenters have never been in the habit of working any of it, so that they are ignorant of its nature ; but let them once make a trial of it, and their prejudices will vanish. Nor is poplar a whit behind the best fir for doors ; and, as it is less apt to warp than lime, it is of course preferable for this purpose.

It is well known to cabinetmakers that of all the different kinds of wood for the best dressing-room tables, when left of their natural colour, none can equal the lime, it being of a beautiful white, and retaining its natural colours for many years. In window-shutters and finishing it will look much better without paint, than the best American fir can do with it, and will last ten times longer.

4. With respect to the last objection, viz. that home-grown timber requires more labour in working it than foreign wood, I have already shewn that the latter can be as cheaply applied to joisting, roofing and flooring, as the former. I grant that, in respect to doors, window-shutters and facings, the labour is greater ; but the difference is very trifling, and the advantage in point of durability very great.

Let us suppose that the finishing of one room, 20 feet by 16, with three bound doors, two sets of window-shutters, and facings, with American fir, will cost L. 2, 15s. for journey-men's wages. Now, lime and poplar are nearly as easily wrought as fir ; but suppose they cost even a third more, say 18s. 4d. In ordinary farm houses or cottages, as we have taken a large room, the average of each room will not be more than 10s. ; and on the whole building of an ordinary farm-steading the whole expense will not exceed L. 5.

Now, let us consider the result of all this in an inland county, Roxburghshire, for example, and at Hawick, or in

its neighbourhood. The average price of foreign timber, including carriage, is 2s. 8d. per foot. Now, a proprietor building a good farm-stead and offices, will require at least 4000 feet, which, at 2s. 8d., cost L. 533 : 7 : 4. In all this country, say from Kelso westwards, there are vast quantities of young woods coming up, and a vast quantity already for sale, on several estates, where I have myself marked off and valued many hundreds of pounds worth. I never went above 2s. per foot for oak stripped of the bark (unless in the case of particularly fine trees); 1s. 6d. for ash; 1s. 6d. for beech; 9d. for Spanish chestnut; 1s. 6d. for lime; 1s. for poplar; the average of which, taking an even sum, is 1s. 4d. For 4000 feet, this makes L. 266 : 13 : 4, which, subtracted from L. 533 : 7 : 4, leave a balance of L. 266 : 13 : 8. What an immense saving on so small a house as that supposed by a proprietor using his own timber! But this is not all. If the building be made with foreign wood, his son perhaps will have to renew it, or at least it will have to be replaced in a period of 100 years; whereas home-grown timber will last for many generations.

I may here farther observe, that, were there no demand or sale for home-grown timber in these inland districts, and were it necessary to drive it to a sea-port before it could be sold, the expense of carriage would leave very little indeed to the grower. In the inland parts of Berwick, Selkirk, Peebles, and Aberdeen shires, where there are vast tracts of young plantations, the use of home-grown timber is particularly worthy of notice. Proprietors of woods, wherever they cannot obtain a fair price for their own growing timber, should never buy one inch of foreign wood, however near a seaport they may be, as this is obviously throwing away their money for that which profiteth them not.

There is another advantage in the circumstance that the most valuable of the timber need not be used for building. Oak, beech, ash, elm, chestnut, lime and poplar, of from 25

to 40 years' growth, will serve the purposes mentioned, and the produce of natural woods, even at twenty-five years, will do. If the trees are large enough to be split, that is sawn through the middle, for two joists and couple logs, they will answer; but they should never be used with the heart in them, that is as whole trees; and all the bark should be stripped off, and the wood seasoned with lime, as recommended in a recent publication.

I was lately at Hovingham Hall, in Yorkshire, the seat of William Worsley, Esq., who is building a princely mansion. Being far inland, the foreign wood, carriage included, cost him, the best kind, nearly 3s. per foot; while for his fine oak, and other timber, of which he has large quantities, he could only get from L. 2, 10s. to L. 5 per ton, or about 2s. per foot at an average. He was at length advised to employ it instead of foreign timber, and floored with it his two public rooms, one of which is upwards of 46 by 30 feet, the other nearly the same size. When the sun shines on these floors, they present a very beautiful appearance. All the windows, too, are of oak. Beech, when cut into deals two inches thick, makes excellent inside stairs, and lasts as long as most kinds of freestone. In many modern good houses there, oak and other kinds of home wood are used for windows and flooring.

I have already mentioned the advantage that would result to every wood proprietor, were he to have circular saws, driven by water, where it can be had, not only for the use of the estate, but for the purpose of cutting up wood to be disposed of. Machinery might be advantageously applied to sawing the wood to be sold, as the purchaser could not cut it at so cheap a rate, and the proprietor would be a gainer, as when cut out upon the ground it is much more easily carted to a distance. In inland districts, where the rough wood has to be driven a distance of from 30 to 40 miles, before a market can be got for it, the expense of carriage is often nearly equal to the price of the timber; this is decidedly the case with

Scotch fir, which sells at from 9d. to 1s. per foot at sea-ports, where alone there is a demand for it; so that the carriage for forty miles will be at least 9d. per foot. Besides, in building cottages and ordinary houses for tradesmen, &c., the principal expenses are for the joists, roofing, and flooring; all which are chiefly used without any other working than the application of the saw and axe. If this be done on the ground where the timber grows, the expense will be much less than when sawing is done by manual labour; so that all house-builders and proprietors in towns, and everywhere, could be served with home-grown timber at a much cheaper rate; while by using it in preference to more expensive and less durable foreign timber, they would hand over to their heirs a substantial building that might last for centuries, in place of one constructed of American timber, and which may serve the father but not the son.

REPORT ON THE MANNER IN WHICH TWO FIELDS AT INVERMAY WERE LAID DOWN TO PERMANENT PASTURE IN 1828. *By ALEX. H. MURRAY BELSHES, Esq. of Invermay.*

[An honorary premium having been offered to the proprietor or tenant who should, in any year, report the most successful experiment in laying down land, of an extent not less than ten acres, to permanent pasture, either with indigenous grasses, or with a mixture of these with clover, or other plants adapted for herbage, the Society's Gold Medal has been adjudged to Major Belshes, for the following Report, lodged in 1831.]

THE extent of the two fields, of which the soil is dry, upon a porous rock or gravel, is about 34 Scotch acres.

One field, containing 20 Scotch acres, after being manured

with about thirteen double cart-loads of dung per acre, was sown with turnips in 1827. The other field, containing about 14 Scotch acres, after about thirty barley bolls of Forthar lime per acre had been spread in the drills, without any dung, was also sown with turnips in the same year. One half of the turnip crop was eaten off each of the fields with sheep, and the other half was carried off to the cattle.

In 1828, both fields, without any further application, of manure of any kind, were sown with barley and the following mixtures of grass-seeds, viz.

Sheep's Fescue,	. . . . .	6 bushels.
Cocksfoot,	. . . . .	5 do.
Sainfoin,	. . . . .	2 do.
Cowgrass,	. . . . .	70 lb.
Catstail,	. . . . .	40 do.

From Messrs James Dickson and Sons,
seedsmen, Edinburgh.

White Clover,	. . . . .	185 lb.
Red Clover,	. . . . .	130 do.
Pacey's Rye-grass,	. . . . .	26 bushels,

From Messrs Dickson and Turnbull,
seedsmen, Perth.

Together with 7 bushels of Hard Fescue, and 5 bushels of Cocksfoot, collected in the grounds at Invermay.

The fields have been regularly pastured every year since they were laid down in 1828.

Independently of the two fields above mentioned, and previous to 1828, upwards of 30 Scotch acres were laid down to permanent pasture, with similar mixtures of grasses; and since that period, upwards of 70 Scotch acres, not including the fields before mentioned, have been laid down to permanent pasture, with a variety of those indigenous grasses which seemed best adapted to the different soils.

The various experiments that have been tried here have afforded the most satisfactory results; and the decided superiority of the natural over the artificial grasses hitherto in use, has been clearly established, particularly in wet land, upon a cold and retentive bottom. Although the utmost attention had been employed in selecting them, the artificial grasses gradually decayed, and at the end of three years almost entirely disappeared; whereas the natural grasses, with the same treatment, have every year become stronger. Even where no calcareous matter has been applied to the soil, in the case of the natural grasses, the improvement in feeding has been equal to one-seventh part of additional stock. The natural grasses also possess a very important advantage over the artificial, inasmuch as they are considerably earlier, and many of them continue to grow throughout the whole year.

INVERMAY, 1st November 1831.

REPORT OF EXPERIMENTS ON THE COMPARATIVE ADVANTAGES OF FEEDING STOCK WITH MANGEL-WURZEL, TURNIPS, AND POTATOES. *By Mr ANDREW HOWDEN, Lawhead, East Lothian. Communicated in a Letter to the Depute-Secretary.*

IN compliance with your wish, I now send you the results of an experiment which I have been conducting during the past winter, and in which mangel-wurzel has been used to the extent of two acres—partly by itself, and more extensively as a mixture with ruta бага and potatoes, in feeding cattle. Having been in the practice of cultivating annually from one to three acres of mangel-wurzel for ten or twelve years past, during which I had read and heard much on the subject of its value, compared with turnips and potatoes, and observing that the Highland Society were making this an object of interest, I resolved to attempt something which would satisfy myself

upon a subject which I considered of importance ; and with the intention also of communicating to the Highland Society the results of my experiment, should I be able to deduce any thing seemingly useful from it. With this end in view, I set about planting 3 Scotch acres of good, dry, free land, with mangel wurzel of the red sort, 6 lb. to the acre. The land had been previously a crop of oats after hay, upon which a full dressing of sea-weed was laid. It was deeply ploughed in autumn, and got two spring furrows, the last across. On the afternoon of the 16th of May I began planting the seed in the following manner :—The land was ridged in the same way as for turnip, and in the drills were spread from 18 to 20 tons of good farm-yard dung. Immediately upon the dung being covered by the plough, the drill barrow was regulated so that its coulters should leave an open cut of about $2\frac{1}{2}$ inches deep: Into this the seed (which had been steeped in lime water a week before) was put at a foot distance. Much attention ought to be paid to putting in the seed. The length of the drill being measured, the women who are to plant should have equal shares of the distance laid off, the shorter the stretches the better, as a plain roller should instantly follow to close in the earth above the seed, which ought to have been pressed into the bottom of the cut by the thumb of the planter. I repeat, that without strict attention to this, there is much chance of having an unequal braird. It is true the root transplants like a cabbage, but I prefer the plants found in the seed row at first ; indeed a complete justification of this opinion was afforded in the present instance. On the 16th, while the labourers were engaged in the work, I attended closely to them, but business calling me from home on the morning of the 17th, I gave strict charge to a confidential man that he should see the work performed with the same precision. Notwithstanding this injunction, there were many more blanks in the one acre planted by him, than there were in the two others. Upon these blanks being filled up, the plants put in were watered with about 15 puncheons from a cess-pool into which the

washings of the dung-pits run. It was applied in about equal shares two separate afternoons, and a hole having been first made by the dibble near to the plant, it received and retained a quantity of the liquid until it was gradually absorbed. Having so minutely observed upon this part of the process, I shall only mention, that the crop should be ploughed and hoed in a manner very similar to a drilled crop of turnips,—and this is now generally understood throughout Scotland. In this way did I proceed, and with such management the crop was distinguished by uncommon luxuriance.

Seeing about the beginning of August that a good many of the plants were running to seed, I had them drawn and given daily as the food of two bulls which were confined in the house. Towards the end of harvest I began to take off the outside leaves and give them to the milch cows, by which I rather think the growth of the roots was checked. The leaves beginning to fade about the 1st of October, I daily cut completely over a regular portion of them, which were given to cows and young sheep promiscuously. On the 2d of November I sent a portion of the leaves to be weighed, and the land having been previously measured, I found the weight of leaves per acre to be $10\frac{1}{2}$ tons. We next proceeded to weigh a portion of the roots, which gave a return of 25 tons 1 cwt. The crop was now taken up by the plough, and stored in separate acres with perfect exactness.

But I must here attempt more distinctly to bring into view the object sought for, and the manner of obtaining it, although I am aware that a detail of facts and circumstances, drawn up by one so little accustomed to write as I am, is not likely to be satisfactory. The object sought for by me, then, was the knowledge whether 3 acres of land produce in beef would be the greatest from a crop of Swedish turnips, of mangel wurzel, or of potatoes. To attain this knowledge, I caused a surveyor to lay off five acres of Swedish turnips, two acres of mangel wurzel, and two acres of potatoes. It has been already stated that the

mangel wurzel produced 25 tons ; and by the same steel-yard the weight per acre of Swedish turnips was 28 tons ; while the produce of potatoes per acre was 73 bolls of 4 cwt. each, or 14 tons 12 cwt. ;—all of which I think very full crops.

The produce being stored in three separate lots, I tied up twenty-one cattle of six quarters old bred by myself, seven of which, designed No. 1, were put to consume one acre of Swedish turnips, one acre of mangel wurzel, and one acre of potatoes. Other seven, designed No. 2. were to be allowed two acres of Swedish turnips and one acre of potatoes. The remaining seven, designed No. 3, were to consume two acres of Swedish turnips and one acre of mangel wurzel. The whole of the lots were at first allowed a few distillers' grains and a little straw throughout. I should here remark, that only about one-half of the ruta бага was taken up and stored at first ; the other half was stored in the middle of January ; and the whole of the mangel wurzel was stored in an untrimmed state.

It is worthy of notice, that the situation to be chosen for storing is of great consequence. I had the mangel wurzel intended for the feeding stock put up in separate acres, about 40 feet from the feeding shed, which protected the store from the prevailing west winds. The other acre's produce, set apart for the milch cows, was built up in a separate heap, the same width at bottom as the other lots (7 feet) ; but from exposure, having only a moderate covering of straw or thatch, the roots upon the west side, towards the month of March, lost their juices, and I think their feeding quality. In other years I have seen loss occasioned by too great a body of roots being heaped together, when they fermented and spoiled.

In following out this experiment, I have taken up an opinion, that upon good land, in an early situation, mangel wurzel can be grown to advantage, and given as a mixture of food in fattening cattle. In its use, a circumstance occurred which I shall mention. In the lot of cattle No. 2. the food of which consisted of Swedish turnips and potatoes, one of the number

was often swelled to such a degree as made me fear I should lose the animal. Salt and water, oil, &c., were repeatedly used, but by no means with speedy relief. I directed the feeder to introduce among his food four roots of mangel-wurzel daily. While this was continued the beast never swelled. I withdrew it, and in a week the animal became tumefied as before. I again gave back the mangel wurzel, and for a month there has been no appearance of swelling. Variety seems gratifying to the appetite of even the inferior animals, and for this reason a mixture of food seems preferable.

The effect in the present case may not be altogether satisfactory, because the cattle taken to show it, were not all bred from the same stock. I must now explain, that on a measurement being taken on the 30th January, I immediately took a pair of cattle out of every seven, and confined them to one particular species of food. To one pair of lot No 1. I gave potatoes and water; to another pair of lot No. 2. I gave Swedish turnips; and to another pair of lot No. 3. I gave mangel wurzel. I refer to the tabular statement of the monthly increase of girth, which does not indicate any great superiority; but some good judges say the mixtures have a decided preference, and, next to a mixture, the particular food of Swedish turnips is preferable.

So much for fattening—and now for the dairy. I have mentioned that one acre of mangel wurzel was put in store for the milch cows, of which I have seven: five of these got a very small quantity to keep them fresh—the other two were allowed as much as they were disposed to eat. This, however, was not the case for the first ten days—as both mangel wurzel and potatoes ought to be given at first in small quantities, for they both operate too powerfully as a purgative, and the mangel wurzel likewise as a diuretic. The two cows put to full allowance had calved at mid-summer, and were not again in calf. I wished to try if they could be fed and milked at the same time. One of them has been sold fat, and the

other, I may say, is fat also—but they had draff along with the mangel wurzel. Their produce throughout the time has been 4 Scotch pints each per day—this was sold at threepence per pint; and as I have seen that without draff each cow will produce one shilling's worth of milk for every hundred weight of roots (and perhaps of leaves) consumed, in this way the milk from such a crop would realize L. 35 per Scotch acre. This to me seems a startling sum—but I give the facts, as I have repeatedly seen the cows milked.

As a summary of this lengthened detail, it seems to me that the food for cattle, whether raised from the land in the shape of Swedish turnips, potatoes, or mangel wurzel, is not materially different, provided the crops are alike good of their kind. A less quantity, and inferior quality, of manure, will produce the potatoes even on land where the soil and climate are not so favourable; but I have ever seen, at the end of a rotation, the land upon which potatoes had been grown in the worst condition; and to obviate this, it is of use, I think, to cultivate a variety which covers well in the drill. This is a subject to which I mean, this season, to give my attention, seeing the Society's premium offered.

I now subjoin a Table of the monthly increase of the several lots of cattle, and shall be glad if it is thought to contain any thing in the least useful.

TABLE of the Monthly Girth of 3 Lots—each Lot consisting of 7 Beasts.

	LOT No. 1. Food. 1 Acre of Potatoes. 1 . . . Mangel Wurzel. 1 . . . Swedish Turnip.	LOT No. 2. Food. 1 Acre of Potatoes. 2 . . . Swedish Turnip.	LOT No. 3. Food. 1 Acre of Mangel Wurzel. 2 . . . Swedish Turnip.
1831.			
Nov. 30.	35 feet 8 inches.	35 feet 9 inches.	35 feet 8 inches.
Dec. 30.	36 ... 6	36 ... 7	36 ... 6
1832.			
Jan. 30.	38 ... 2	38 ... 4	38 ... 2
March 1.	39 ... 7	39 ... 8	39 ... 6
..... 30.	40 ... 8	40 ... 10	40 ... 6
April 30.	41 ... 4	41 ... 7	41 ... 3
28 tons of Swedish turnip and mangel wurzel withdrawn, and used for other cattle, leaving still in store one month's provision for the 21 cattle.			

Girth of Pairs of each of the above Lots, put upon different Food 30th January.

	LOT No. 1. Potatoes.	LOT No. 2. Swedish Turnip.	LOT No. 3. Mangel Wurzel.
1832.			
Jan. 30.	10 feet 8 inches.	10 feet 5 inches.	10 feet 4 inches.
April 30.	11 ... 6	11 ... 3	11 ... 2

The cattle have been sold, and the purchasers agree in opinion, that the lot of seven fed on Swedish turnips are from 7s. to 10s. a-head better than the other lots. The average advance upon the original value of each is L. 6, 12s. ; and the cost of grain being deducted, there remain L. 120 in return for the eight acres produce consumed. I am aware that this is liable to be doubted, in such a year ; and the produce is certainly much beyond that of any other part of the lands possessed by me.

It ought to be stated that the mangel wurzel was stored in an untrimmed state. When the roots and earth which adhere

are taken away, the loss of weight may be greater than I imagined. In hazarding an opinion of the return which it would make in milk, I made no allowance for this.

I am inclined to think, that less attention has been paid to selecting a good kind of mangel wurzel seed than has been bestowed on either turnips or potatoes, as I noticed in the crop under this experiment a very striking disproportion in the weight, two or three roots weighing 10 lb. or 12 lb. standing together, while those adjoining could scarcely be said to have roots at all.

DESCRIPTION OF SAWING MACHINES FOR FELLING TIMBER;
LAID BEFORE THE SOCIETY IN COMPETITION FOR THE
PREMIUM IN 1831.

[Descriptions and models of Sawing Machines, adapted for felling timber, having been transmitted to the Society, in consequence of its having offered a premium for the most simple, economical and effective application of the circular saw to that purpose, the following have been considered deserving of notice, and their authors have received premiums, varying according to the importance of their inventions, which has been judged to be that of the order in which they are here given.]

I.—CIRCULAR SAW. *By Mr THOMAS JACK, Westmill of
Craigdallie.*

MR JACK's sawing machine, represented in Plate III. Fig 1., consists, first, of a ground frame AA, in form of the common handbarrow, $8\frac{1}{2}$ feet in length by $2\frac{1}{2}$ feet in width; on one side of which is erected a vertical frame BB, of $3\frac{1}{2}$ feet in height. The second compartment comprehends a traversing frame or carriage CC, about 5 feet in length, and 2 feet in

height, the vertical bar *a* being prolonged upward, and having its top and bottom ends formed into pivots, on which the carriage is made to swing, carrying all the working machinery. The saw *b*, of 24 inches diameter, is fixed on the lower end of a vertical spindle, and immediately above it a bevelled pinion *c*, which is driven by the wheel *d*; the winch handle by which the power is applied, is fitted upon the same spindle. The saw pinion and the wheel *d* are in the proportion of 1 to 5, so that when the handle is turned with the ordinary velocity of 40 revolutions a minute, the saw will make 200 revolutions in the same time. In order to keep the edge of the saw in contact with the saw-draft, a vertical spindle *e*, carrying a pulley *f*, of 1 foot diameter, is placed at the outward extremity of the carriage; the pulley *f* is put in motion by the band *g*, passing over a smaller pulley on the winch axle. On the spindle *e*, there is also fitted a small drum *h*, capable of being disengaged at pleasure from the motion of the spindle by means of a clutch. The cord *i*, which passes round the pulley *k*, in the ground frame, has one end attached to the carriage; while the other end being attached to the drum is coiled upon it when revolving along with the spindle, thereby carrying forward the saw with a slow and uniform motion. When the operation is completed, the small drum is disengaged, and the cord is allowed to uncoil, while the carriage is moved backward to prepare for the next cut. For the support and guidance of the carriage, an iron segment *l* is fixed upon the lower part, which slides through eyes in the ground frame; and the machine is kept steady while at work, by two iron *dogs*, the hooks of which are driven into the roots of the tree.

The certificates accompanying the model of this machine bear ample testimony to its successful application on the large scale; and shew that it can be worked, and carried from tree to tree, by two men. The machine here described is calculated for felling trees from 8 to 12 inches in diameter.

SAWING MACHINES FOR FELLING TIMBER.

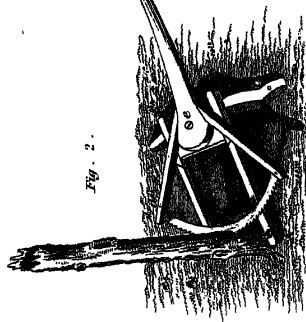


Fig. 2.

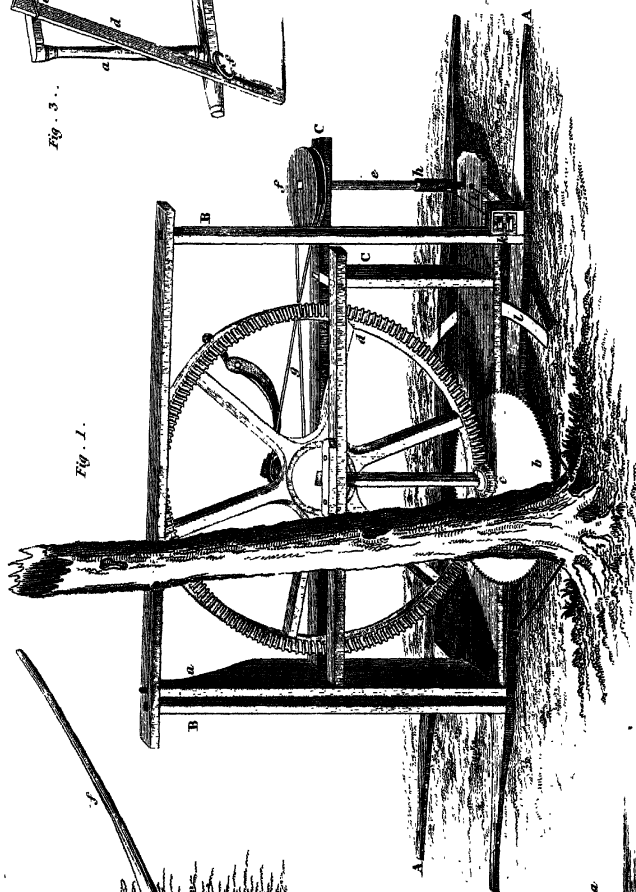


Fig. 1.

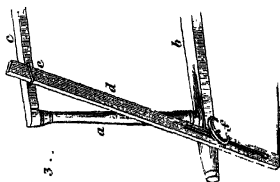
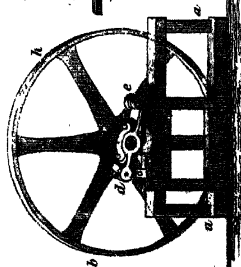


Fig. 3.

Fig. 4.



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II.—RECIPROCATING SAW. *By Mr DICKSON VALLANCE,
Libberton, Lanarkshire.*

THIS machine, which is represented in Plate III. Fig. 2, is remarkably simple in its construction. It consists of a frame of timber, 3 feet in length and $1\frac{1}{2}$ feet in width. The front part A rests on the ground, and is armed with sharp studs of iron, which serve in part to attach it to the tree; the hind part B is supported upon and bolted to a cross timber C, which gives to the frame an inclination to the horizon of about 15° . This inclined plane is provided with grooves *a a*, in the side-bars of the frame, to which is adapted the square block *b*, carrying an iron stud or pivot. The saw *c* is in the form of a circular segment, $4\frac{1}{2}$ feet in length, with a radius of curvature of about 3 feet; it is distended in a moveable frame, formed of two radial bars *d d*, which meet at the pivot *e* of the sliding block, and are strongly connected with the lever *f*, by which the saw is worked. The saw-frame is further strengthened by a circular arc of iron, represented as crossing the inclined frame. The operation may be performed by the hand, either directly or through the medium of drag-ropes; and as the saw proceeds in the draft, it is impelled towards the tree partly by its own gravity, and partly by the operator pressing the saw forward. The merit of Mr Vallance's machine lies in the extreme simplicity of its construction, and in the more advantageous position in which the operator exerts his force, as compared with the common saw. It has also been satisfactorily tried on the large scale, and seems on the whole to be an improvement on the common cross-cut-saw, as applied to the felling of timber.

III.—CIRCULAR SAW. *By Mr ALEXANDER GORDON,*
Aberdeen.

THE frame-work of this machine consists of four arms, which cross at right angles, placed near the bottom, and a repetition of the same at the top of the frame-work; the two sets of arms being connected near their extremities by means of four upright pillars. In addition to these there are four auxiliary posts, so fitted with loop-holes, eyes, and screws, that they can be raised or let down, and fixed at any point, to suit inequalities of ground, and are in fact the feet on which the machine stands. A swinging jib, in the form of a St Andrew's cross, carries the saw, which is put in motion by a combination of bevelled-geer, and a drum and pulley, acted upon by a winch handle. The operation of the machine is similar to that of Mr Jack, though it is inferior in many respects. The mode of adjusting the feet to inequalities of ground, seems the chief point on which any superior merit rests, although the whole machine exhibits great ingenuity. This property of adjustment is exhibited in Fig. 3., where *a* represents one of the four pillars of the frame-work, *b* part of an arm of the lower cross, *c* one of the upper arms, and *d* one of the four sliding legs. The eye or staple at *e*, and the loop-hole and pinching-nut at *f*, shew the manner in which this can be effected.

IV.—RECIPROCATING SAW. *By Mr JAMES GIBSON,*
Kirkcaldy.

MR GIBSON's machine is the fourth in the order of the premiums voted by the Society. The reciprocating motion of the saw is produced by the action of a pair of bevelled wheels and a crank, put in motion by a winch handle, while the saw

is sent forward by means of a screw worked by the hand of a man or a boy stationed for that purpose. The action of the saw seems to possess no peculiar merit, but the wheels used for transporting the machine are ingeniously adapted to perform the part of fly-wheels, when the saw is in operation. The method of obtaining this is in some degree represented in Fig. 4., where *a a* is one end of the frame-work of the machine, *b b* one of the carriage-wheels, *c* the axle cut off, and *d e* a lever bar bearing the journal of the axle, jointed to the frame-work at *e*. A sword, *f*, passes through the moveable end of the lever, which is capable of being fixed at different heights by a pin passing through both. The motion of these parts admit of the wheel and axle being raised or depressed in relation to the frame-work, and *vice versa*; thereby putting the weight of the machine upon the bearing parts of the frame when the saw is at work, and upon the wheels when it is in the act of being transported. In the former case, the wheels are prevented from turning round on the axle by tightening the nut which secures the winch handles to the end of the axle, and, in the latter case, the nuts are slackened to allow the wheels to turn *upon* the axle, as in the common cart.

NOTICE RESPECTING THE CLOUDBERRY.

THE Society having offered medals for seeds produced at the Annual Meeting held at Inverness in 1831, Mr J. Mitchell *junior*, merchant, Leith, was induced to transmit specimens of the cloudberry (*Rubus Chamæmorus*) obtained from the highlands of Norway, with the view of recommending the plant as a fit subject for cultivation. It is not rare in many of the mountainous districts of Scotland, especially those in the Grampian range; and there can be little doubt that, should it succeed under cultivation, it would furnish a

very acceptable addition to the kitchen garden. As it exists in the wild state in this country, it does not appear to have any where attracted attention as an article of commerce. Mr Mitchell gives the following account of the fruit.

“ It has a peculiarly pleasant flavour, and is highly nutritious and medicinal. It is used as food in some parts of Norway and Sweden, and is sent in great quantities to Stockholm and Christiania, as well as the other great towns in these countries, where it is highly prized. The inhabitants of the mountainous districts derive considerable profits from collecting it and sending it to market for sale. The berries are either eaten fresh with cream, or are preserved, without boiling, by being sprinkled with sugar, in which way they are much used at table, with venison, fowls, &c. They are also conserved, and used as a confection.

“ The cloudberry, besides being a pleasant fruit, is also useful as a medicine, particularly in bilious complaints. Dr Clarke, the celebrated traveller, cured himself of a dangerous bilious fever by means of it. Mr Inglis, in his journey through Norway and Sweden, says the cloudberry is the favourite wild fruit over all the northern parts of Norway, and describes it as being much esteemed for its cooling properties and agreeable flavour, expressing his surprise that it has not been exported to England, seeing the cranberry, to which it is much superior, has found its way to our tables.

Mr Mitchell proceeds to adduce other authorities in commendation of this agreeable fruit, which certainly might with propriety be subjected to cultivation, with the view of ascertaining its capabilities. It is also possible that, in some parts of our Highlands, it might be collected in the wild state in considerable quantities.

STATISTICS OF SELKIRKSHIRE. *By Mr JAMES HOGG, "the Ettrick Shepherd."*

Names and Etymologies.—The name of the pastoral stream from which this county derives its appellation of ETTRICK FOREST, is manifestly of Celtic origin. In old deeds and charters it is first found written *Alterick*, then *Atterick*, and finally *Ettrick*. *Alterick*, which is really as good Gaelic as a borderer could spell *Alt-Ericht*, signifies the rising stream, or stream of the rapid ascent; and on tracing it from its junction with the Tweed westward to its source, no term could be more appropriate. It runs only thirty miles in all, in a north-easterly direction, and yet the uppermost farmhouse on its banks stands 1212 feet above tide-mark. Indeed the upper division of Ettrick is supposed to be the most elevated pasture-land in Scotland, speaking of the bed of the river, with the exception of the Athol Garry.

The name of the sister stream Yarrow is likewise from the same language, and nearly synonymous. It was originally *Garve*, in the Celtic spelled *Garubh*. Now it is found spelled *Garof* in the chartularies of Melrose at an early date, which, like the other, is almost literal. It was then softened down by the Saxon language to *Zarof*, and ultimately to Yarrow. The original term signifies rough or rugged, and is highly applicable to the river. Of these two derivations there remains no shadow of doubt.

Tyma, a river that joins the Ettrick from the south, near to the parish church, appears to have had its name also direct from the Gaelic *Tiamaidh*, meaning gloomy or solitary, than which term nothing can be more strikingly descriptive of this wild and remote river, on which, before the new road

was lately made along its side, from the bottom to the top, there was not one cheering spot to relieve the eye from the sombre gloom of the glen. There was not even the least mark of cultivation bespeaking it an inhabited country. Dal-gliesh, the name of a large farm on this river, is likewise Gaelic; *Dal-glas* signifying the grey haugh or valley.

Rankle-burn, a parallel river with Tyma, has a compound name like many others, of Gaelic and Saxon, which signifies the ferny or brakeny glen (*Rainachal*); while Meggat is likewise supposed to be from the Gaelic word *Magudh*, a place of echoes or mocking, and its rocks, not to speak of its woods, which, though renowned in tradition, have now no existence, render the name boldly descriptive. This district was anciently called Rodonno, which term I do not comprehend, if it was not from *Righ* and *dun*, the King's Fortress. And here the kings of Scotland had a hunting-seat for centuries, the ruins of which are still extant. It has consisted of two strong towers, and a court between them. All these etymologies plainly attest that the country had been originally inhabited by a tribe of Celts or ancient Britons.

Extent, Form, and Boundaries.—This celebrated classical district is so irregular in its outline, that it is impossible to describe its form. A view of the county map will shew that it is shaped somewhat like the Island of Skye, and indented in the same way with the surrounding counties as Skye is by the ocean. I once heard a Skyeman say, that rather than go round that island following all its inlets, he would go round the world; and though I would not go this length with regard to the county of Selkirk, yet I aver that, before a man should follow the whole of its outline on foot, he might sooner sail round Britain. In some instances he would have forty miles to walk without advancing two. It is only possible to account for this fantastical and interminable division, by supposing that all these isolated parts had formed

portions of the ancient Royal Forest, which their wild and rugged character seems to justify. It is altogether thirty miles long, and from ten to twenty broad, and contains, as nearly as can be calculated, an area of 270 miles. But as Meggat-dale naturally belongs to this district, the river forming a branch of the Yarrow, and the whole having been included in the ancient hunting-forest of the kings; therefore, though now politically attached to Peebles-shire, it belongs to the same pastoral range with Ettrick and Yarrow, and I include it in the description.

Mountains.—These do not properly belong to my sphere, they being treated of in every county survey and gazetteer of the country. Neither should they have been mentioned here, had not the statements given of many of them by the county surveyors been so totally at variance with every thing like truth. This will appear self-evident, if we look in Dumfriesshire at the height given of the Pen of Eskdale Moor, and in Selkirkshire for Ettrick Pen (the same mountain), and see how they coincide. Or look at Hartfeldt in the former county, and the same mountain in Tweeddale, and it will be seen there is a difference of 1100 feet in the height specified, rather a fair height for a Tweeddale hill altogether. Besides these, I could adduce many more absurdities of the same sort, which are dogmatically given in the encyclopedias as matters to be depended on, whereas another leaf gives them the lie.

As to the real heights of any one of these mountains above the sea, I can only take some one of the surveyors' words which I deem the nearest to the truth. But as to the relative heights of the several mountains of any district, these are as well known to the old shepherds and farmers as the relative heights of any person's nearest friends are known to him. They are easily distinguished from the phenomena of nature, both in summer and winter,—as well as looking over the

country from different quarters, in which case the practised eye cannot be mistaken.

The mountain, then, that is by far the highest of the surrounding district is the White Coom of Polmoody, which rises in the immediate neighbourhood of the boundary of Selkirkshire on the west, though not touching it. It is the highest in the south of Scotland. From east, west, north, and south, it is seen with its broad head, like Ben-Nevis in the north, rising above all its brethren. The view from this mountain is prodigious, and not to be equalled in Scotland, excepting that from Ben-Lomond, in richness and variety. The Friths of Forth, Clyde, and Solway are all in view, and it is said the sea at Berwick, though I never could distinguish it. The whole range of the Grampians from Ben-Lomond to Ben-Voirlich is seen; the Cheviot Hills on the east borders; all the high mountains of Cumberland and Westmoreland; the Isle of Man, Arran, and the intermediate mountains of Galloway, Ayrshire, and Nithsdale, rising behind each other like waves of a stormy sea. It is said that fifty towns are seen from it, which I doubt; but I have no doubt that it may be seen from fifty towns. If Dr Walker's measurement of Hartfeldt be at all correct, which I likewise doubt, then White Coom is precisely 4040 feet above the Solway, for the difference of their elevation was ascertained last year by Mr Johnston. The hills of the next great range are all on a par in point of elevation, or so near it, that every shepherd accounts his own the highest. These are, Winterhope Height, Broad Law, Black Doddy, Crawmel Craig, Dunse Law, Dollar Law, Blaik Law, Black Cleuch Head, and Windlestraw Law, all approximating to the same height, and averaging about 3400 feet, forming an immense range of southern Grampians, with White Coom and Hartfeldt at the head of them.

The next in degree are Ettrick-Pen, Andro-Whinny, Ward-Law, White-Wuss, Mount-Benger, Minch-Moor, and Hangingshaw Law of Elibank. All these are on a par in

height, and average about 2200 feet above tide-mark. From these they degenerate into the common green dumpling-looking hills, so common in the forest, and generally named Laws, from the Gaelic word *lagh* (a bent bow), to the form of which the outline of every one of them bears a resemblance. This minute description of the ranges and heights of the mountains, will give the stranger some idea of the face and appearance of this famed pastoral country.

Lakes and Rivers.—The only lakes in the country are St Mary's Loch and the Loch of the Lowes, lying both close together, and famed for the angler's sport and the stillness and pastoral beauty of the surrounding scenery.' But they are now so well known as not to require any particular notice here; and whoever wishes to read a graphic description of them, such as never will be equalled, let him turn up Sir Walter Scott's *Marmion*, Introduction to Canto II.

Loch Skene lies close on the border of the ancient forest, but is all within the lordship of Annandale. There are likewise a number of large but abominable lakes in the south-east division of the county, discharging themselves into the river Ale. The largest of these is Hellmoor Loch! What a horrible name! Yet it is scarcely worse than the appearance of the lake itself. But there are nine of them, all much of a piece in ugliness, surrounded with interminable morasses, and filled with voracious pike. There is very little good trout-angling amongst them all save in Clearburn Loch, and the less that is said of them the better.

The rivers are Ettrick, Yarrow, Tweed, and Gala-water, besides the smaller ones, whose etymologies were given before. What a world of pastoral allusions these names alone recall to the lovers of Scottish song! Ettrick rises on the lands of Pott of Pott-Burn, four miles and a half to the south-east of Moffat, and running thirty miles, falls

into the Tweed a little to the west of Abbotsford. Its first seven miles are excellent pasture land, but lie extremely high, and have no valleys. Its next seven miles, including the vales of Thirlestane and Ettrickhall, are a highland dale of great beauty. Its next seven miles are bare-looking, and any thing but beautiful and picturesque. But its lowest seven miles are the richest of all.

The two uppermost branches of the Yarrow both rise near Loch Skene, one of them within a bow-shot of it. The one of these merges in the Meggat, the principal branch of the Yarrow, and the other in the south water of Chapel-Hope, sometimes denominated Little Yarrow. Both these branches run into the lochs, and combined they form the Yarrow, which flows out of these and joins the sister stream below Bowhill, after a course of twenty-five miles from its source, and fourteen from St Mary's Lake.

Meggat-dale is wholly a pastoral district. Its hills are dark, high, and shaggy in appearance, yet there is no better or surer sheep-land in Scotland. All the land round the lochs is likewise exclusively pastoral, but the holms of Yarrow, from the lake downward, are well cultivated, although much of the district is an indifferent soil, being mixed with water-gravel.

About the lakes the scenery is good. In the middle division, like the Ettrick, it is exceedingly bare and plain-looking, but the banks in the lower division cannot be excelled in beauty. The agriculture of both valleys is carried on in the most improved modern system, generally by the five-shift rotation, but wheat can only be raised in the eastern division of the county, and even there on a circumscribed scale. There are no fiars for it.

The Tweed intersects the county for ten miles of its wildest and most romantic course, from the march of Caberstan below Innerleithen to that of Nether Barns near Abbots-

ford ; and the Gala forms the east boundary to the north-east separating the county from Roxburghshire. The rivers Borthwick and Ale are likewise partly in the county, but do not properly belong to it, and of these detached parts there is nothing particular that can be advanced.

Woods and Forests.—It appears manifest, that anciently Selkirkshire consisted of two royal forests, the Forest of Ettrick and the Forest of Selkirk, for, in the accounts of their teinds to the Abbeys of Melrose and Paisley, they are sundry times distinctly stated. The forest of Selkirk is supposed to have included all that wild range of country from Philliphaugh to Caddenhead, and the forest of Ettrick to have included the two pastoral rivers, with all their tributary streams, and the lands around them.

There are few marks remaining of the ancient woods with which the district is believed to have been covered, and of which unequivocal marks remain in every morass and bog, besides others which fall afterwards to be noticed. The upper parts of the county are, indeed, quite bare of natural wood, it being wholly a pastoral country, and nothing else. About the borders of St Mary's Loch, indeed, a few straggling old trees and ancient thorns remain to mark where a forest has once been ; lower down, however, on the banks of the Ettrick and Yarrow, as well as at Yair and Elibank, considerable remnants of the ancient woods remain.

But of modern plantations there are many, all of which are in a thriving and prosperous state, proving that wood was an indigenous production of the soil. The late Duke Charles of Buccleuch planted liberally, but confined his operations too exclusively to the vicinity of Bowhill, his favourite residence. But the hills of Ettrick Forest are so green, and form such excellent ranges of sheep pasture, that plantations of any great extent would appear in the eyes of the farmer a grievous encroachment. Yet, for the sake of beautifying that wild and

far-famed country, the present Duke should submit to a little temporary loss by planting liberally, which, in the course of a few years, would greatly ornament his two pastoral rivers, and ultimately enhance the value of his property materially. On Yarrow, in particular, there are several points so singularly calculated to beautify the ride from Bowhill to St Mary's Lake, that it is wonderful they never attracted the notice of these liberal and spirited noblemen. And there ought, by all means, to be a large forest at the lochs.

The present Lord Napier no sooner came home to reside in Ettrick than he began planting with a liberal hand, and that, too, in the upper parts of the district, where wood was most wanted. It is truly astonishing what his efforts have effected in so short a time. They have beautified the country exceedingly. The fine old woods of Hangingshaw have likewise been well flanked with young ones by Johnstone of Alva. Boyd of Broadmeadows has done his part adjoining these; so have all the Pringles on their lands of very ancient inheritance in the eastern parts of the country.

Roads.—The ancient roads of the county are a great curiosity. They are generally termed Thief roads, or King's roads, as if the terms had formerly been synonymous. They are uniformly made along the ridges of hills, and appear in many instances to have been formed with great labour, morasses being cut through to the bottom, and the stony channels laid bare; rocks splintered, and broad roads cast, winding up steepes to gain the level or slanting height; whereas, in all the valleys and hollows, there was not a vestige of a road formed before the middle of the last century, a clear manifestation that the country had not only been formerly covered with forest-trees, but overrun with underwood, which had rendered it impervious to travellers, the hollow ways and openings being the paths naturally followed, if at all passable.

Of those ancient king's roads there have been astonishing

numbers. Traces of them may be seen almost on every ridge of hills leading from south to north, but in no other direction. A few of them are still kept open as travelling paths, which may not be shut up, such as one over Minch-moor, one over Whitehope-ridge, and one over the Kirk-ridge of Traquair. But the most ample and curious one is that from Nidpath Castle at Peebles into the Royal Forest, along the heights of Newby and Glenrath, and must have been that on which the royal train passed to the hunting; but since that day it has lain in total desuetude, not having been formed for answering any other purpose.

So late as the year 1788, there was not a single carriage-road through the county, save the London mail road, that intersects a part of it by Selkirk. There were a few narrow paths, formed here and there, leading to gentlemen's houses, but no communication through the county with any other. In that year, there was a mutual agreement between the counties of Dumfries and Selkirk, to open a communication between the latter town and Moffat, nature having there formed a fine natural opening. The scheme being a grand one, and promising many advantages, it was begun with energy on both sides, and soon finished. But such a road ! Why, imagination could not have conceived such a line of communication unless in ridicule of human judgment. It is still traceable, and whenever looked at must excite a smile of pity, if not of derision, at the absurdity of the last generation. The survey of the Ettrick and Yarrow division deserves to be kept on record, it was so excellent. Mr Adam Laidlaw was road-surveyor for the county then, and a set of experienced pioneers came and contracted for eight miles of the road upon the ground, and after a deal of wriggling, the bargain was closed at *fourteen pence per rood of seven yards* ! for forming, finishing and altogether.—“ Think of that, Mr Brook.” Then, after the bargain was struck, the head contractor said to Mr Laidlaw,

“ Now, are we to follow the old footpath all the way, or will you not rather mark out a better line ?”

“ What it behoves you to do is this,” answered Laidlaw ; “ wherever the old path is the best line, follow it. But when you can get a better, take that.” “ Very well, Sir,” said the contractor, “ that’s quite sufficient ;” and this was the whole of the survey made of these eight miles. The men of course took always the line that was easiest made, up hill and down hill, it was all the same to them. Laidlaw swore terribly at some of the abrupt ascents afterwards, when it was out of time.

But the roads and bridges were never put into a complete state of repair, till the present Lord Napier settled in the country ; and to his perseverance Ettrick Forest is indebted for the excellence of her roads, now laid out and finished in every practicable direction, as well as for many other valuable improvements. With an indomitable spirit of perseverance, he has persisted against much obloquy and vituperation, and from none more than the writer of this article. But, honour to whom honour is due, Lord Napier has effected wonders, and the late impervious Ettrick Forest may compare in the beauty and efficiency of her roads, with any mountain district in the united kingdom.

Improvements, Ancient and Modern.—The forest of Ettrick continued a hunting station of the kings of Scotland from the days of Alexander the Third to those of Queen Mary Stuart, who was the last sovereign that visited it, and who remained a few days there principally on account of some silver mines which her people were then working at Glangaber, near St Mary’s Loch, of which a printed account is still extant, written by Bulmer, her chief miner, who appears to have been the original of the celebrated Dousterswivel. But by some means or other, the Douglasses and

other feudal lords had taken the whole of the revenues of the forest into their hands, for the space of 200 years. In 1503, however, James the Fourth resumed his royal rights over the district, took it all again into his own hands, stocked it with 20,000 sheep, and endowed his queen, the Lady Margaret of England, with the whole of the revenues thereof, together with the castles and manors of Selkirk and Newark ; and thus began the first attempt at improvement in Selkirkshire, by a brave and beloved sovereign, whose temerity afterwards cost the natives so dear. It is quite apparent, that before this period the forest was never occupied as a sheep country. The revenues of the Abbeys of Melrose and Paisley derived from it were extensive, but paid in deer, oxen, capons, and victual. James stocked it with 20,000 black-faced sheep, which were not the indigenous breed of the Scottish Lowlands, but from that period continued to be termed the Forest-breed, till no longer bred there. Where King James could get this immense stock of sheep, at a time when sheep were so little used as a farm stock in Scotland, would be a curious inquiry, but one not likely ever to be satisfactorily answered. It has been generally supposed that he brought them from Fife, not a very likely sheep district. Pitscottie indeed says that the king got as good an account of them as if they had been pasturing on the lands of Fife ; but does not say, as if they *still* had been pasturing there.

King James's sheep-farming speculation under Mr John Wood having turned out a good one, the district was by degrees wholly stocked with sheep, all from the king's breed, and continued to be stocked with the same excellent and hardy breed, until the late ruinous war prices induced the farmers to change them for finer-woolled kinds. But before we come to speak of these breeds more particularly, we must make a few remarks farther on the ancient mode of farming in that district. It having been only the middle division

of the county that the king stocked with sheep; the two Deloraines, the two Mount Bengers, and all the other farms held now by the house of Buccleuch; of course it was a long while before ancient prejudices were laid aside, and that the sheep stocks reached the outer boundaries of the county. In all the high lying grassy farms, the occupiers had shielings for the summer tending of cattle, of which there are unequivocal marks in every glen. You have the mark of the little bothy or shieling there, the small round fold for the calves, the larger one for the cows, and the little milking bughì for the cross camstary ones. There you have the long ragged fence between the high and the low grounds, or between the summer and winter grazing. Within this all their arable ground was contained, spread in patches here and there, over an immense surface, and within this fence the cattle were not admitted till the harvest was over. The extent of land that had once been cultivated on these hills is truly amazing, and that before the usage of the plough was known. There are thousands of acres which must have been cultivated by the hands with mattocks of some description, on which there are no marks of the plough. Indeed, the irregular heaps of gathered stones on these parts precluded the practicability of cultivating them with the plough, while at the same time they prove that they have been under cultivation. The inhabitants appear to have been put to the hardest shifts to obtain food; for every laird was obliged to keep a number of retainers proportioned to the extent of his lands, while the subordinate occupiers of the soil held their leases on the same terms. As a natural consequence of a numerous population, cattle and tillage had long continued the principal avocations of the forest farmers; and the county all over still bears, and will bear for ever, the indubitable marks of this antique system of farming.

But the great improver of Ettrick Forest, and the greatest benefactor she ever saw, was Duke Henry of Buccleuch,

grandfather to the present Duke. When that worthy and amiable nobleman came to the possession of his ample domains, he found nothing there but amplitude to recommend them, save what had been done by the hand of nature. There was not a property in Britain, no, not in the most remote Highlands, in a more deplorable situation. There seemed never to have been a single amelioration attempted on it, from the time that it had been a scene of constant warfare between the Scots and their powerful neighbours. The best farm-houses were mere hovels. There was not a single enclosure, not even a round for sheltering the flocks in a storm. There was not a thorn hedge, a planted tree, nor a surface drain, over all that extensive property. It was singular that it should have been so, but so it was, which must have been partly owing to the confusion the family was thrown into by the death of Monmouth, and the political troubles which ensued. Francis, the second Duke, engaged keenly into politics, and at all events paid no attention to his patrimonial domains, so that the whole improvement of a valuable country was left for Duke Henry to begin. He entered upon it with a spirit and liberality unequalled in the annals of Scottish improvement; and it is needless to add, that he proved amply successful, and lived to enjoy the effects of his liberality, to see the face of that country, the prosperity of which was the highest delight of his heart, altered from a desert to a land of beauty, of profit, and of gladness. These were the halcyon days of the forest farmers, days of prosperity, which there is too much reason to fear they will never experience again; for it is easy to imagine that a proprietor who finds his rent-roll increasing even beyond his most sanguine calculation, can more naturally afford to be liberal than he who finds it decreasing in the same proportion.

I am sorry to say that improvements of utility are retrograding sadly on his Grace's lands in Selkirkshire, owing, it is said, to the nine years' leases, and no ameliorations of any kind allowed by these leases, save what the farmer pleases to

lay out himself. Neither is there any remuneration allowed for these, if he is turned out or gives up at the end of the lease. So that if the sentiments of the farmers of whom I made inquiries be correct, it so happens that though his Grace has all the kindly national feelings which the best of his ancestors had, both his estate and his farmers are fast going the wrong way.

There is something peculiarly grievous and discouraging in all this, at a period so gloomy, and among a class that were wont to be envied by all the farmers of Britain. No man blames his master, for his discounts have been liberal, but all are dissatisfied, and at present greatly discouraged. Johnstone of Alva and Lord Napier again accept of yearly rents, apportioned to the sales from each farm, and thus still keep their farmers going on and contented ; but a great part of his Grace's farmers have been obliged to give in, so that the present system requires to be modified.

Proprietors, Tenures, &c.—As nearly as I can calculate, from information gained on the lands, the Duke of Buccleuch possesses about one-half of the extent of the whole county, and about one-third of the rental, he having scarcely any of the eastern division, which is mostly low land and arable. Then follow Johnstone of Alva, Lord Napier, and Lord Traquair, with sixteen other proprietors, whose lands stand valued in the cess-books from L. 1000 to L. 2000 Scots. The royal possessions in the forest seem to have fallen mostly by some means or other to the house of Buccleuch. I suppose that, on the downfall of the old feudal lords of the forest, the Douglasses, the Scotts got easy possession. Many of the smaller proprietors held their lands in feu from Melrose Abbey, and on its final breaking up remained the proprietors. But such of those as retain possession of royal lands still pay a small feu-duty to the crown, which, to the amount of L. 320, is annually collected by Lord Dunglas, the present ranger of Ettrick Forest. Several of the farms are likewise held blench

of the crown, for the payment of a bow, a pair of broad arrows, a dog-leash, a rose, &c., all of which I suppose the present honourable ranger does not trouble his head about.

Present Stock of Sheep.—From the days of King James, downward to the year 1785, the black-faced or forest breed had continued to be the sole breed of sheep reared in the district, and happy had it been for the inhabitants had no other been introduced to this day. However, about that period, the farmers in the eastern division of the county began to introduce the Cheviot breed, which, for the space of ten years, continued to creep westward by slow and doubtful degrees, till the year 1796, when the demand for Cheviots began to increase so rapidly, and still to go on progressively, till it grew absolutely little better than the tulipo-mania that once seized on the Dutch. The border districts, with all their exertions, could not supply the twentieth part of the demand. There were instances of 18s. 6d. being given for second ewe lambs, and 23s. for runs off the top ones, scarcely half drawn; and for these trash the excellent black-faced native ewes descended from the royal flock were dismissed with contempt, and disposed of for a mere trifle, probably about half the price that was given for the Cheviot lambs.

The old shepherds were extremely indignant at these mad proceedings of their masters, and several of them, it was said, died out of chagrin, and raved about *the doddies*, as they called the new stock, in their last illness. They could no more live in a country in which they saw at every turn the white-faced shilpit-like wretches crawling about the laig-gins of the hills, all attended to as if they had been fine ladies, and the powerful native sheep driven to the heights, and running wild like deer. They actually despised to mix with the intruders, as decidedly as hares do with rabbits, seeming not to regard them as creatures of the same species with themselves; and, when gathered to the same fold or shedding-

place together, the old stock made such breaks out through the others that they run great numbers of them down.

But a number of other farmers, in order to approximate as nearly to the fashion as possible, were obliged, through their necessity, to cross their ewes with Cheviot rams. For these latter, without doubt, they paid swinging prices, yet the expenses attending this experiment were nothing at all compared with those of the true stock, and in a few years the cross breed proved by far the best of the two. There have never been such good sheep of the white-faced breed seen on these mountains as were produced on some farms from the second to the fourth generation of these crosses, and in some instances for a year or two longer. In the course of time, however, they degenerated as the rest improved, which a cross-breed of every description will ultimately do if suffered to breed on.

It is now decidedly the opinion of experienced farmers in general, that the old black-faced breed of sheep is the best for at least one-half of the pasture lands of Scotland; provided, and be it enacted, that pains be taken to make the wool of that particular breed as fine as possibly it can be made, without a mixture with any other more delicate breed. This never has once been attempted, but precisely the reverse; for the breeds of the short or black-faced sheep, were always chosen from the roughness or shagginess of their fleeces, and always the coarser the truer was the breed held to be.

I am now going to tell the pastoral farmers what many of them will not believe, it being against both general theory and practice: it is, that the bright brocked, or black-and-white-faced ewe, with the horns turned backward, rather low at the shoulder, and having the fore-part of the fleece exceeding close and fine,—this kind, I say, which is constantly guarded against, is the heaviest, the hardiest, the best nursing, and the best feeding sheep of the breed. True, they have lowish shoulders and round rumps; but these are

in fashion with short ladies at present, and why not with short ewes. If these could but be supposed beauties, they are in every respect the best and most profitable stock of the breed. The fashionable breed with black faces, wheel horns, forming two-thirds of a circle, and shake-rough fleeces, is the handsomest breed, indeed the handsomest breed in the world, but in every thing else the other is their superior.

Moreover, every short stock has a propensity to turn into that shape, and particular species, and it takes more changes of rams to keep it out of a stock than is required to preserve any other breed. Whereas, were the finest woolled brocked-faced rams always selected, the best breed of sheep might be reared with wool equal in quality to the first cross between the black-faced and Cheviot breeds. It would be necessary to submit to the low shoulder and great round heck, but in all such matters utility ought to rule fashion.

With the number of sheep in the county I would not have meddled, had it been at all truly stated, either in the Statistical Account of Scotland, or in the late Survey of Selkirkshire, published by Oliver and Boyd; for my object in this essay is only to delineate such things as are not generally known, and have never been touched upon by any other writer. But the census of the sheep as given in both these works is so much exaggerated, that I am obliged to contradict it. For instance, the number of sheep in the parish of Yarrow alone is stated at 55,000. Would not any reader of experience start at the number and exclaim, "That is a great number indeed for a lowland parish in the small county of Selkirk!" So it certainly is, but it happens to be upwards of 20,000 too many, and must have been taken when the lambs were following their dams, which is no true census of the stock, nor is any other save exactly the winter holding. I have ascertained the numbers of wintering stock in that parish to be nearly 33,000; of these, 2000 are of the black-

faced breed, resorted to again ; 2000 Leicesters ; and the rest of the Cheviot breed.

The parish of Ettrick, in these accounts, is stated to contain 30,000 sheep, which are likewise fully one-third over-rated ; so that, to come near the truth, we must subtract one-third from these accounts, which are borrowed in the one work from the other. In all other things they are pretty correct.

Cattle.—The cattle kept for domestic purposes are mostly of the short-horned breed ; but small farmers and feuars prefer Ayrshire cows, as they produce more milk from the same weight of carcass, and require proportionally less food. There are consequently many crosses between this latter breed and the short-horns, and these constitute a very handsome, hardy, and useful kind of animals. The whole of the domestic class of these animals last year amounted to 3000.

But there are besides these a great number of the Highland breed grazed on the sheep-pastures, it having been found by experience, that, since the complete draining of the district, the overflow of succulent grasses is such, that, without correction, by a mixture of cattle with sheep, proportionate to the extent of drained land, the grass is totally lost, and all lodged before Lammas.

This is a wise provision of Nature, giving the farmer a chance of both kinds of stock. In all these boggy drained districts, the more cattle a farmer keeps from the beginning of May to the middle of August, the more sheep he will be enabled to keep through winter, as they make the grass and sprouts rise with a much stronger and thicker sward, and prevent them from lodging.

From Lammas forward their beneficial effects with regard to the pasture become hardly equivocal. And though it has become customary both to winter and summer them, it has always appeared to me, that by buying them at Dumbarton,

or any of the May markets, and selling them again at Burghill in autumn, a great deal of trouble and occasional loss would be saved.

Towns and Villages.—SELKIRK, the county town and only market town in the Forest, is a royal burgh of ancient erection, and celebrated of old for the valour of its inhabitants. No situation can be more beautiful and commanding than that of Selkirk, on the crown of a hill overlooking the Ettrick, and with an extensive view of the Forest hills to the westward, and those of Roxburghshire eastward, many rich vistas being interspersed among them. But as all its rights and immunities, with every minute thing relating to it, are published in the late Political Survey of the County, they lie quite out of my way; my aim being to avoid all previously published information.

I have great hopes that Selkirk will be ultimately benefited by the changes in the representation, and the choosing of burgh magistrates, for, with all its ancient honours and surrounding pastoral beauty, it was in other respects a queer place. It never having possessed any manufactory worth mentioning, save the highly estimated one of manufacturing the fourth part of a member of Parliament, it was amazing how the whole hearts and souls of the burgesses were wrapt up in that important concern, and how much ill blood it frequently engendered among them. They were generally divided into two inveterate parties, of nearly equal numbers and advantages, and it depended much on the pioneers of each party which of them carried each of the important points. And then they entered with such vehemence into the discussion of these affairs, with strangers of all descriptions, who knew nothing about them, and cared less; so that really if this change in affairs should prove of no farther advantage to Selkirk, it will at all events prevent them from making fools of themselves.

GALASHIELS is a place of far more importance to the country, and inhabited by a class of unequalled industry and perseverance; and though they have met with some severe losses, like the phoenix they arise from the ashes with fresh vigour and beauty. No account has ever been given of the extent of the Galashiels manufactories at all commensurate with the truth, but that they have increased far beyond what the most sanguine ever calculated on, is only an indefinite truism; for the fact is, that I cannot state it with certainty, nor do I think any man could, without a trouble for which the information would form no recompense, the business being separated into so many companies, and their ramifications. The author of the Political Survey, published last year, says, with a grave face, that Galashiels consumes no less than 412 packs of wool *annually*! Had he said *weekly*, he would have been nearer the point. But I really do not know the quantity manufactured of late years; only this I know, that they consume the greater part of the wool in the country around, together with great portions of the best wool of the Borders, besides laying out thousands every year on the fine foreign wools. Of late years, indeed, when the wool became such a drug in the market, had it not been for the spirit of the Galashiels manufacturers, the farmers of Ettrick Forest might have set their potatoes with their tarry wool, for no other person would give money for it.

I have no hesitation in pronouncing the Galashiels manufacturers an honour to their country, and men who are entitled to all confidence and encouragement. For the rapid improvement that they have made, they have been a good deal indebted to their chief proprietor, Scott of Gala, who has always behaved towards them with a great deal of public spirit and liberality. But they have been far more indebted to their late pastor the Rev. Dr Douglas, and Mr George Craig. This last gentleman, being a native of Galashiels, and deeply interested in its prosperity, and being likewise Gala's

factor, and the original banker of the town, has always stood a stronghold to the manufacturers in time of need. It is needless to deny that these two have been the making of Galashiels. It has lost the one, and when it loses the other, his place will never be supplied.

Local Improvements.—The Honourable Lord Napier falls to be first mentioned under this head. Indeed he is the only living proprietor who has at all exerted himself for the general improvement of the country, and suffered no local advantage, either for beauty or utility, to escape. Besides his indefatigable exertions in completing the roads already mentioned, he has raised many thriving plantations, which have quite altered the face of the wild but beautiful dale, and on a smaller scale he has also beautified the sources of the Yarrow. He has built many handsome and comfortable cottages for tradesmen and labourers, which serve both for ornament and utility. He has established sheep markets on his own land, free of all customs or expenses, at which a great deal of business is now transacted in lambs, draft-ewes, and wool, greatly to the advantage of the farmers. He has established a pastoral society for the improvement of the breed of all sorts of live stock, the effects of which, in a local point of view, have been as beneficial as those of the Highland Society in a general one. There is an annual exhibition, and a member knows he can get a premium for superior stock of whatever description. In short, there is no nobleman or gentleman whom I know of, who has done so much for a district as Lord Napier has done, and all only from resources rather limited. He deserves well of his country; and the good that he has done for an ungrateful district shall not die with him, but shall be remembered and estimated at its full value when he is no longer to enjoy the approbation.

Ballantyne of Holylee has made a gem of a new mansion on the banks of Tweed, and when I have mentioned the late

improvements made by Scott of Gala in the town of Gala-shiels, I may be said to have exhausted this head.

Disadvantages.—The great disadvantage under which Ettrick Forest labours, can never be removed, and therefore it is needless to regret it ;—the great distance from coal and lime which in many of the southern parts of the county cannot be got nearer than forty miles, and from that to twenty. This is a great drawback, but no more can be done than has been done, if we except the finishing of one line of road, which has shamefully stuck still on entering Lothian. But as the county abounds with excellent peat-mosses, the necessity of coal is in a great measure superseded. Great exertions have likewise been made to supersede the lime by burning earth into ashes for manure ; but, though it succeeded to a certain degree, it was found that the same expenses laid out on lime had a better and more permanent effect.

But the far greatest drawback on the society, elegance, and animation of Ettrick Forest, is the late wretched practice of laying it all out in led farms. In some divisions of the county, where there were of late respectable farmers, with large families, and numbers of servants and retainers, there are now nothing but a few solitary shepherds stalking over the country. This, to the elder inhabitants, who have seen and enjoyed other days, gives a prospect of desertion which is truly melancholy. To such a height has this been carried of late, that, where there are even the best farm-houses, and policies befitting gentlemen, for the miserable pittance which these farms bring more of rent, they are at once turned into led farms. There was one so let last year on which the reduction of inhabitants was thirty-five ! I know five farms, all lying adjacent, on which I recollect of former inhabitants, forty-five souls of farmers, their wives, sons, and daughters, with male and female servants in proportion. There is now a solitary shepherd, or at most two in each of them. If this

calls not for some legislative interference, I know not what does. There ought to be a tax laid on led farms, equivalent at least to the advance of rent which they produce, otherwise the class of pastoral farmers must vanish from the land.

Character of the Inhabitants.—The shepherds are a most respectable and intelligent race of men ; and, as far as regards the Scriptures and Church History, greatly superior to their masters. There is a singular difference between the shepherds of Ettrick parish and that of Yarrow ; for it must be remembered that the inhabitants of both are principally shepherds. Those of the former are far more intelligent and dogmatic, great readers, and fond of research in history and polemical divinity. Those of Yarrow are more devout, regular, and decent in their demeanour, without any desire for reading or research at all. In Ettrick they have a well-stocked parish library, and a debating society. For Yarrow, the farmers established a library for general use ; but there never was a shepherd joined it but one, and he got his share in a present. This is a singular contrast, but it has been observable for many generations, and has generally been placed to the influence of the Reverend Thomas Boston, who was minister of Ettrick for the greater part of his ministerial life, and whose energetic doctrines roused that spirit of intelligence in Ettrick, which continues to this day decidedly superior to the surrounding parishes. His memory lives embalmed in the veneration of the inhabitants, and justly so, for he impressed the hearts of their fathers with a love and a reverence for the doctrines of the Cross, for which their children still retain a strong enthusiasm. It has been the fashion for a good while past, with a certain class of professed Christians, both preachers and hearers, to sneer at the doctrines of Boston. I decidedly differ from them, and will venture to assert that there are no such fervour and strength of reasoning to be met with in any modern composition, as predominate in his. Let any person take up “ The Four-fold State of Man,” and

peruse seriously and without prejudice one of the divisions, or say only twenty pages at random, and he will join with me. There is even an originality of thought and expression in old Boston which are quite delightful and refreshing. He died in A. D. 1732, and of late years a neat monument has been raised over his tomb.

On the other hand, the people of Yarrow have, for the last seventy years, been in general much better supplied than Ettrick with the doctrines of Christianity. About the commencement of that period, they got the Reverend Dr Lorimer, a powerful and popular divine. Dr Cramond followed, a still more energetic preacher, and a most learned and able man. The present incumbent Dr Russel has been forty years minister of the parish; and the primitive simplicity, purity, and dignity of his life and manners, as well as doctrine, have had the effect of modelling all those bred under his ministry to some resemblance of his character. Still, with all these advantages, the characters of the parishioners remain much the same, and as different as one country or colony is from another. There are no more parishes wholly within the county but these two.

Eminent Persons.—For these see Chalmers's *Caledonia*, the *Statistical Account of Scotland*, and the *Minstrelsy of the Scottish Border*; for, to copy any thing from any work extant, is not the object of this essay, but to supply desiderata where manifestly wanting. I must, however, mention two personal acquaintances connected with the county who have created a great deal of interest in the world. These are the late Mungo Park, the celebrated African traveller, and Sir Walter Scott, who has been Sheriff of Ettrick Forest now for thirty years. Park was born on the most romantic spot on the banks of Yarrow, in the then farm-house of Fowlshiels, which is now used as a lumber-house. I knew him partially both before he went first to Africa and after his return. When a young man he was modest and retiring with strangers,

and did not speak much or freely, unless to very intimate acquaintances, with whom he was always gay. It was some time after his return to Scotland, and marriage with his first and only sweetheart, Miss Alicia Anderson, that I met with him again. He was then all good humour and glee, and his manner and address still very much like that of a superior farmer. He was tall, boardly, and muscular, the calfs of his limbs rather thin in proportion to his chest and loins. His countenance was kind and open, and altogether no person of moderate discernment could be in his company at that period without discovering that he was in the company of no ordinary man. In appearance, his brother Dr Adam Park might sit for his likeness, supposing them of the same age. His eldest son died in India, and the second perished wofully in Africa, endeavouring to trace his father's steps to the scene of his lamented death.

To speak of Sir Walter Scott as a literary man, would be the height of absurdity in a statistical writer. In that light he is known and duly appreciated over the whole world, wherever letters have found their way. But I shall say, that those who know him only by the few hundreds of volumes that he has published, know only the one half of the man, and that not the best half neither. As a friend, he is steady, candid, and sincere, expressing his sentiments freely, whether favourable or the reverse. He is no man's enemy, though he may be to his principles; and I believe that he never in his life tried to do an individual hurt. His impartiality as a judge is so well known, that no man, either rich or poor, ever attempts to move him from the right onward path. If he have a feeling of partiality in his whole disposition, it is for the poachers and fishers, at least I know that they all think he has a fellow-feeling with them,—that he has a little of the old outlaw blood in him, and, if he had been able, would have been a desperate poacher and black-fisher. Indeed, it has been reported that when he was young he sometimes

“ leistered a kipper, and made a shift to shoot a moorfowl i’ the drift.”

He was uncommonly well made. I never saw a limb, loins, and shoulders so framed for immoderate strength. And, as Tom Purdie observed, “ Faith, an he hadna’ been crippled he *wad* ha’e been an unlucky chap.” He is now sixty-one years of age, and hopes are entertained that he will yet recover his vigour both of body and mind.

Antiquities.—These have likewise been investigated and discussed by Sir Walter Scott in his Notes to the Border Minstrelsy, &c. and therefore one or two general remarks only remain to be made by me to complete all that can be known, for there is really little worth knowing. The most ancient castle, then, in the old forest range is that of Crawmell, on Megget, which was a royal hunting residence long prior to the days of Robert Bruce. It is said to have been built at the same period with the castles of Nidpath and Oliver, by one of the Alexanders, kings of Scotland. The etymology of the name is doubtful, perhaps from the Gaelic *Croch-maol*, meaning the Brown Snout, which is quite applicable. There is only one baronial castle remaining, which is known to have belonged to the Douglasses, so long the hereditary lords of the forest. It is that of Blackhouse, or Douglas Burn, which differs from all the rest in its form. But the largest and strongest of these castles are those of Elibank and Newark, both built at an early period by chiefs of the Murrays. The rest of the towers, which are without number, have all been built by the Scotts during the reigns of the Jameses. The grave-stone of Cockburn of Henderland, beside St Mary’s Loch, whom King James V. hanged over the castle gate of Henderland, has a very antique appearance. It is shaped like the lid of a coffin, and the inscription, which is in Saxon characters, is across the head and down one side. “ There lyis Peryis of Cockburn and Maigotlan.”

ESSAYS ON THE DISEASE IN SHEEP CALLED FOOT-ROT.

[The Society, desirous of obtaining authentic information respecting the disease known by the name of Foot-rot, which has been found to commit extensive ravages among sheep in various parts of Scotland, offered a premium for the most correct account of well authenticated facts relative to it, and bearing especially upon the varieties of the disease, its first symptoms, its constitutional effects, its causes, hereditary or contagious nature, the pastures or soils most subject it; and, in general, any information that might be of use in the investigation or treatment of the complaint. Three Essays have been received, to all of which premiums have been awarded, and of which the more important particulars are here given. The authors agree as to the seat of the disease, and the general principles on which its cure may be effected. Two of them view it as simply contagious or infectious, and communicated by ichorous matter left on the ground, while the third maintains that it is hereditary and not contagious. The treatment recommended consists essentially of paring the hoof and applying corrosive or stimulant solutions. The information afforded by these Essays, which are written by persons practically acquainted with the disease, may enable those interested in the subject to decide as to the means most likely to subdue it, more especially if they at the same time consult the excellent paper by Mr Dick, published in Vol. II. of the Agricultural Journal; and Mr Black's judicious remarks in the third volume of the same work. Neither of these gentlemen considers the disease as hereditary or contagious. It would indeed appear that no satisfactory evidence has yet been adduced to shew that it is otherwise than topical, dependent upon causes which do not act primarily upon the constitution, and not communicated by the contact of morbid matter.]

L.—ESSAY ON FOOT-ROT. *By Mr WILLIAM HOGG, Shepherd, Parish of Stobo, Peeblesshire.*

IT is little more than twenty years since the foot-rot was known as a regular and contagious disorder among the mountain flocks of Scotland. Previous to that time, it was common enough among the softer breeds, grazing on low, rank pastures, and which, in many places, it was usual to shut up in houses and sheds during the night; but the ailment was considered to be only a casual and temporary one, productive of no very serious injury. As it began to spread among the mountain flocks, the numbers exposed to its influence, the rapidity with which it was propagated, and its destructive consequences, induced the storemasters to regard it with more attention; when it was found to be a very contagious disorder, going regularly through its various stages, and when not checked on its first appearance, leaving the animal so low, that it fell a victim to poverty long before the commencement of mild weather, and the return of abundant and nutritious food.

A few remarks on the structure and connexion of the parts affected by this disorder are necessary as an introduction to the subject. The hoof, which is of the same general nature as wool, hair, and horn, is at its point, when sound and healthy, exceedingly hard; but, as it approaches the heel, becomes soft and elastic. The sole is also hard at the point, and becomes softer and thicker as it approaches the heel, where it is about half an inch thick. Both hoof and sole are destitute of sensation, the latter, from its elasticity, easily sinking into small indentations when the animal treads on any hard prominence. In the centre of each hoof, and nearly of the shape of the external hoof itself, is the hoof-bone, the base of which is hollowed into a kind of sole, while its upper part is articulat-

ed to another small bone, which reaches to the place where the hoof divides. The hoof-bone is closely invested with a fleshy incrustation, pitted, like a honeycomb, with small indentations, and apparently very sensible. Between this and the horny hoof is another substance, which, lining the hoof internally, adheres very closely to it. These two substances are incorporated at their surface by means of a natural cement or bond of union between the dead and living matter, which holds the hoof firm and immoveable. It is the dissolution of this compound substance that constitutes the malady in question.

The first indication of the foot-rot is a slight halt in the animal. It gradually increases, and in two or three days the animal assumes a lank appearance, lags behind the rest, lies much, and when roused, appears anxious and confused at finding itself alone. It becomes more and more lame. Frequently the hoof is swelled; and in the course of five, eight, or ten days, the insensible lamina which lines it is dissolved, and the hoof hangs loose around the exterior of the foot, entirely separated from it, except at the upper edge. The disease also eats through the hoof, generally at its lower edges, after which the horny part comes away in fragments. The insensible part of the sole also peels off, leaving the sensible incrustation, which invests the bone, quite bare. The animal is then obliged to gather its food on its knees. It remains in a single spot all day, turns very lean, and, if the summer be soft and sultry, is unable to preserve itself from the intrusion of the flesh-fly, so that at length maggots swarm over its whole body. If it lingers on till about Martinmas, when long exposure to the air and sharp nights of frost kills the contagion, a new hoof grows from its upper edge, and the foot is again sheathed in a horny case; but if winter sets in with severity, the animal, already disfigured by pain and disease, generally falls a victim. Such are the consequences of foot-rot, when the disease is not interrupted in its progress; but the event is now seldom fatal, as every endeavour is made by the shepherd to

detect the malady in its earlier stages, when it can be successfully treated.

On examining the foot, in the first stage of the disease, the coronary edge, though no external injury can be traced, is sometimes found a little swollen and inflamed. At other times the hoof is eroded; but whether it be shattered or entire, an intense heat is always perceptible in the foot, with a strong pulsation of the arteries, where they are inserted into the coronary edges of the hoof; and, however sound the hoof may appear externally, the connexion between it and the interior of the foot is always dissolved, though the separation is not evident till the hoof is pared away. A peculiar smell is perceptible, especially in the advanced stages, or when the ulcerous part is newly opened; yet, even in the worst cases, a large quantity of ichor is never discharged, there being little more than will wet the finger, and that only when pressed among it.

The way in which contagion is conveyed to the foot has never been clearly ascertained. Some are of opinion that it is introduced by the smell, or that the virus left upon the grass by the diseased animal effects the healthy one through the medium of its food. In either case, it must first affect the juices of the body, and might naturally be supposed to affect the general health, before settling in the hoof. But no appearance of this kind has ever occurred to my observation, lameness in one of the feet being always the first symptom which I could notice. There are many cases in which the virus may be communicated directly to the foot, without previously passing through the system. The hoof grows out, or is renewed rather more than once a-year, and its growth pushes forward in the direction of the toe or tip. Hence the toe is often extended to an inconvenient length, and at every step gets entangled among heath and grass. This protrusion soon acquires the hardness and solidity of iron, and in time is accidentally torn away, sometimes carrying with it a consi-

derable portion of the hoof, and then exposing the sensible incrustation which covers the hoof-bone. The virus left upon the herbage may thus come directly into contact with the absorbent surface of this exposed part of the foot. The scarf skin which covers the coronary border, and which is thin and tender, may also admit the virus through its pores. The disease, as has been said, may exist where the hoof is sound and firm, and in this case it must have been communicated through the cuticle, or by the smell, or along with the grass eaten by the animal, or in some other unknown way. But in whatever way it is transmitted, it proceeds with great rapidity.

When it is suspected to exist, if an extraordinary heat and strong pulsation do not clearly shew that it has begun, the hoof should be gently squeezed between the fore-finger and thumb, when, if it hastily swell out, and slowly return to its usual tightness, when the pressure is removed, the substance which holds the hoof firm round the foot is shewn to be dissolved, and the hoof may safely be opened to get at the affected part. If these symptoms are not so evident as to satisfy the shepherd, and if the lameness still continue, there is no other method for discovering the disease than paring through the hoof. If the foot be uninfected, slight tinges of blood will appear just where the lining of the hoof and the sensible incrustation coalesce. But, in all cases where the disease is clearly made out to exist, the loose hoof must be pared away, that the diseased surface may be freely exposed to the air. In taking away what is loose, care should be taken not to go farther than the disease has spread at the time, nor to make it bleed, as the part which is cut is apt to become ulcerous. In dry weather I have usually found three or four dressings with a proper unguent, sufficient to overcome the disease, and leave it in a fair way of recovery. When the weather is wet, the dressings are not so effectual, especially if they are done in a sheepfold among mire and dung. In this

case the foot should be first washed clean, then dried carefully with a cloth, and pared ; the unguent should then be poured on so as to insinuate itself into every puncture and crevice left by the disease, and the animal should be held until the unguent is dry, when it should be set on clean grassy ground.

Caustics have been usually resorted to for the cure of this disease, and the substances employed have been various. The following composition I have found to be the speediest, the most powerful, and by far the mildest : To make one gill ; to two ounces of turpentine, put half an ounce of diluted vitriol ; stir the residuum of the turpentine from the bottom before using. Pare away what of the hoof is loosened from the foot, then anoint it with the above composition. Beware of cutting, or otherwise bruising, the sensible part of the foot ; for this encourages the growth of fungous granulations, which are often very difficult to be destroyed. If the weather be dry, and the operation properly conducted, two or three dressings with this mixture are usually sufficient to remove the disease.

To keep infection from the rest of the flock, and to have the diseased at all times in sight, a small park should be allotted to the latter, in which there should be placed a wooden pen or fold, for the purpose of sorting them. The sortings are usually necessary every second or third day ; but their frequency must be determined by the state of the weather and the obstinacy of the case.

There is no reason for believing that there is more than one specific malady known by the name of foot-rot. All the cases that came under my observation went through the same stages, exhibited the same symptoms, and yielded to the same cure ; but the degrees of obstinacy with which they resist the same treatment are very different. If the sensible incrustation be heedlessly crushed or wounded, or the hoof pared till it bleed, fungous flesh is very apt to rise ; in which case the

cauterizing iron must be applied. But, unless the cure be mismanaged, there is no tendency to produce fungoid granulations.

The disease is simply contagious, and not hereditary ; nor does it seem to affect the constitution previous to its appearance. Wherever it exists, it spreads with an unvarying and constant progress, till it has established itself among the whole flock. On its first introduction, it spread the more securely, that it was long thought to be merely an ulcerous foot, which would soon dry up of itself ; but the order and certainty of its course soon convinced the store-farmers that it was a peculiar and contagious disorder. In all situations where it has obtained a footing, we find it beginning in a particular place, and, if unopposed, extending on all sides wherever there are sheep to be affected by it. To these circumstances I may add the universal belief among store-farmers and shepherds, that it is decidedly contagious. There is no reason for supposing that an animal which has once had it, is more liable than another to its attack. It prevails much between Whitsunday and Martinmas. The cases are more obstinate in spring and autumn ; but in winter they are generally rare.

There are no soils to which it may not be communicated ; but on dry and elevated pastures, if any exertions are made for its suppression, it cannot spread extensively. There the range of the animal is wide and single ; its walk is seldom crossed by its neighbours ; the air is pure and invigorating, and deadens the contagion sooner than when it has been left on the grass springing from a rank and warm soil ; as moisture and foulness are known to strengthen the disease, all rank pastures encourage its extension, and it is on soft grassy soils that it prevails most steadily.

When a sheep-farm or district is free of this disorder, the strictest attention is necessary to guard against its importation. When once introduced among a flock, there is no preventive that I know of, but the most vigilant attention on the

part of the shepherd, who must use every means in his power to check its progress. This he can do only by noticing the infected, and confining them in an enclosure. If the shepherds are anxious and vigilant in detecting it, and make a judicious use of the cure, they at length succeed in extirpating it. But if the summers be wet, the stock numerous, and the disease extended, it may take several years to root it out entirely.

ESSAY II.—*By Mr ALEXANDER LAIDLAW, Bowerhope, Selkirkshire.*

THE period at which the foot-rot was introduced into Britain is unknown. It has been gradually diffused over the middle and northern counties of Scotland, from the Cheviot Hills, and by means of the breed named after them. The black-faced breed, which, till about thirty years ago, was the prevailing one in the middle and western counties, was entirely free of it until they became intermixed with the Cheviot breed; but now its attacks are not confined to any particular race, and when a stock is fairly infected, it becomes extremely difficult to extirpate the malady.

That the disease is highly infectious, every person at all acquainted with it readily admits. It seems to be communicated by the ichorous matter from a diseased foot, left on the ground, and applied to the feet of a healthy sheep. An acquaintance of mine pared the feet of his sheep, at the clipping season, making them smooth and flat in the sole. In one part of the hirsle many sheep were infected, and these were first pared. The other part of the hirsle, by standing in the same field, and retreating by the same roads on which the first had been, also became affected. The disease is moreover communicated from one foot to another of the same animal when a healthy foot comes into contact with an infected one.

Sheep are liable to be partially infected on any soil; but

when the pasture is stony, or hard and bare, the animals travel more in search of food, and thus keep the hoofs short and smooth, and more free of cavities or lacerations about the toe and sides of the foot. On this account, sheep fed on dry hard pastures are less subject to foot-rot than those fed on soft and rank pastures.

Individuals may take it at any season of the year, but it is generally worst in July, August, and September. Whenever the weather is hot and moist, the disease spreads rapidly; but in cold and dry weather, and especially when it is frosty, it is much less severe.

Sheep which have once had the disease are in general more apt to take it again; but the malady is not hereditary, being simply communicated by contact.

In order to understand the precise seat of the disease, it is necessary to examine the structure of the foot. We shall begin at the lower extremity of the leg or shank, where we have the fetlock-joint or ankle, the external and posterior part of which is protected by two horny substances, which we call *heather-clouts*. Then we have the pastern, or space between the ankle and hoofs, which, in healthy sheep, is covered with short hard hair. Lastly, we have the horny crusts or hoofs, which completely envelope the foot below the coffin-joint; the posterior part of this is the heel, the anterior extremity is the toe, and the lower part, or that in contact with the ground, is the sole. The coffin-bone is finely enamelled above, where it receives in a socket the coronary bone; but in the rest of its surface it is porous, especially towards its lower extremity; the pores are filled with an unctuous substance, which also pervades the sensible lamina interposed between the coffin-bone and the horny hoof. This sensible lamina is the seat of the disease.

It seems to me very probable that, like several cutaneous diseases, the foot-rot is occasioned by animalcules, which, having entered by some crevice, or by the top of the hoof,

attack the sensible lamina, in which they form a colony, and by their constant irritation produce the disease. At the same time, the existence of animalcules has not been ascertained by observation, nor am I aware that the disease has ever been subjected to the microscope.

The first symptom of the disease is the halting of the animal, which gradually increases, and ends in decided lameness. The foot feels hotter to the hand than ordinary; and there is a tumid appearance about the heel, or between the toes, or the hoof is in some degree loose. It affects different parts of the feet, at different seasons. In summer and autumn, it often begins about the most pliant part of the hoof; but in winter, it is generally found bursting from the thicker and stronger parts of the hoof, leaving it cracked and shattered. When the weather is warm and rather damp, the disease generally begins about the heel, or between the toes, where there is little or no horny covering. In cold seasons, especially if rather dry, it is fully as apt to begin about the toe or sole. In any case, when neglected, it gradually gets worse, and often destroys the sensible lamina.

When the disease is in the tip of the toe, it is more difficult to cure than in any other part of the foot, which arises in part from the difficulty of exposing the affected part, without injuring it by the operation, for, when cut, it bleeds profusely, and so prevents the medicine from taking effect. An ulcerous excrescence also frequently projects, which it is difficult to heal, as this part strikes or trails upon the ground.

In attempting the cure, the first thing to be done is to clean the foot well, by means of a soft and pliant cloth, or by washing with soap and water, and subsequent drying. The operator then proceeds to search for the seat of the disease, and for this purpose carefully pares away every loose part of the hoof. In the operation of paring, the hoof should always be left thin at the edge, as cutting it aslant as much as possible prevents it from pressing on the unsound parts, and also

facilitates the growth of the new hoof. When the paring has been effectually and gently performed, lay on the medicine with a feather, or a flat piece of wood; and after keeping the sheep in hand for two or three minutes, until the foot has dried, turn it into a house or dry corner, where it should stand three or four hours. In ordinary cases, a single application is sufficient; but when the sheep has been long infected, and the disease is deeply seated in the lamina, a second dressing may be necessary in the course of a week. As the disease is inflammatory, the practice of wrapping the foot in cloth is reprehensible. To prevent infection, the unsound sheep should be kept separate if possible; and, in the place where they are ordinarily dressed, a little litter ought to be used, that it may be kept clean.

Many remedies have been recommended and employed, especially those of a corrosive nature, such as oil of vitriol and butter of antimony. The former is too severe in its effects, although it is efficacious, and we prefer the latter. It has been used in this district for several years, and with as much success as any other medicine. When the disease has been of long standing, and the foot is much ulcerated, caustic medicines are not so applicable as unguents; but mild applications have not been found in general so effectual as active ones. The following preparation has had considerable celebrity in the north of England, and in this part of Scotland: Corrosive sublimate, 1 oz.; blue vitriol, 2 oz.; verdigrise, 2 oz.; white copperas, 4 oz.; dissolve in half a bottle of white wine vinegar. It is applied with a feather. Another medicine, which has been found to answer, consists of verdigrise, 1 oz.; blue vitriol, 9 oz.; spirit of turpentine, 1 gill; distilled vinegar, 3 gills. I have sometimes used a mixture of tar and common salt, with great success, especially in damp weather.

Tar has also been applied to the feet with the view of preventing the disease, and probably with some effect; but as it ul-

tunately disappears, the feet become exposed to the contagion. Paring the hoofs, at smearing and clipping times, has been found of great service, especially in soft pastures, where the hoof is apt to grow too long. In rich pastures sheep acquire a lazy listless habit, which prevents them from taking the necessary exercise, and it is therefore beneficial to keep them gently moving about, which also tends to keep the hoofs short and clean. I am of opinion that catching the moles on sheep pastures is prejudicial, as the earth of the mole-heaps has a good effect upon the pasturage, and, if we trust to experience, seems to facilitate the cure of foot-rot by clearing the hoofs.

I have only to add, that all which I have said above is the result of personal observation, with the exception of my opinion as to the animalcular nature of the disease, which, of course, can be confirmed or refuted only by microscopic investigation.

ESSAY III.—*By the Rev. HENRY S. RIDDELL, Drydean,
near Selkirk.*

THE disease called Foot-rot in sheep prevails to a greater or less extent in almost all the pastoral districts of the Lowlands of Scotland. It is generally believed to be contagious, and the circumstance of its having become more prevalent of late, is attributed to the importation of stock from the Cheviots, where the disease is common. Various methods have been tried for its cure, but none of them have been so successful as to deserve implicit confidence.

The causes of Foot-rot may be resolved into two kinds, the constitutional and the accidental, both of which may exist simultaneously in the same case. When the accidental causes are in operation, the disease is distinguished by the damage which the exterior of the foot has sustained. The hoof is

found broken at the point, or otherwise damaged ; or it has become elongated and softened, so as to be bent upwards, or in a lateral direction. The soft parts connecting the hoof with the bone, are, in this distorted condition of the foot, rendered liable to disease, which commencing in the lower parts proceeds upwards, the upper part of the hoof encircling the outside of the foot usually retaining its natural position longest. It is generally between the sole and outer crust that the separation between the hoof and flesh takes place; but frequently the hoof remains entire, while the disease has made considerable progress. When the hoofs are pared off, the flesh exhibits small furrows containing thin clear matter, or it appears white and moist, or presents a livid hue. As the disease advances, the fleshy part assumes various appearances, and sometimes the whole foot, hoof and all, becomes utterly crushed and deformed. Although more or less inflammation usually accompanies this variety of the disease in its earlier stages, it yet subsides when the malady is at its height. In the constitutional variety, on the contrary, inflammation, tumours, fungous excrescences, and the formation of matter, are the principal characteristics. The hoof, instead of being damaged by accidental causes, seems to be diminished in size, and is often altered in shape. As the disease advances, it continues to decrease, gradually becomes harder, and at its extremity sometimes dwindles to a mere point. In this variety, the disease commences on the inside of the foot, generally between the toes, and proceeds downwards towards the sole. The parts between the toes are for the most part denuded of hair, and overspread with a whitish humour, the removal of which shews the skin to be inflamed, thin blood sometimes oozing out from it. Various appearances, however, are presented, such as small tumours, papillæ, or ulcers, and usually there is an accumulation of dirt, hair, and matter between the toes. When the disease has proceeded for some time, a discharge of matter often takes place at the ends of the hoofs. The foot

becomes swelled to a considerable distance above the hoof, exhibiting various morbid appearances. All the four feet are equally subject to the disease. The result of both varieties is the same, the disease tending to deprive the animal of the natural use of its feet, and consequently to injure its general health, by preventing exercise and a due supply of food.

In its worst state, the disease is evidently accompanied with fever and loss of appetite, the animal ceasing to ruminate, and breathing with difficulty; but no sooner has it been fairly removed than the sheep rapidly recovers; and even in the most severe and protracted cases, death does not necessarily ensue. Lean sheep seldom or never take it; and even in a flock that is in general good condition, the fattest only become foot-rotted. In severe cases, the natural cure is effected by the shedding and renewal of the hoof; and before this process has been completed, the season is in general far advanced. This circumstance has given rise to the idea that "frost cures the foot-rot."

Various opinions have been entertained as to the nature of this disease, some referring it to the peculiar qualities of the soil or pasture; others to the season or state of the weather, and many to contagion. The causes which give rise to the accidental variety, are injuries received by the feet in passing over rough hard ground, an unnatural softening and elongation of the hoof in damp weather, and in soft rich pastures, and the accumulation of dirt between the hoofs, caused more especially by sheep being driven into miry folds. Of the variety which arises more particularly from constitutional causes, the season or state of the atmosphere is to be considered as the great primary cause, operating through the soil or pasture, and producing the scalding between the toes with which the disease commences, and a ranker and more nutritive herbage, which predisposes to the diseases existent in the constitution, rendering one animal from its peculiar habits more subject to the disease than another. The foot-rot, therefore, is hereditary, and not contagious.

It does not appear that sheep once affected by this disease are afterwards more liable to it than others. On the contrary, there are grounds for supposing, that, instead of hurting, it has often the effect of purifying and improving the natural constitution of the animal. The period at which sheep are most liable to be attacked by it is when the pastures are at their height, and the animals in the best condition, usually the two last weeks of August, and the whole of September. When arising from accidental causes, however, it may take place at any season.

The principal means that have been tried for preventing foot-rot, are paring the hoofs when they have become elongated, which is usually done at clipping time, and washing the feet after coming out of dirty folds, by driving the animals through a stream. As to the kinds of soils and pastures most liable to it, all are agreed that they are those which are richest and dampest. There are perhaps none altogether free from it; but those on which it occurs only to a very limited extent, are the hardest, barest, and poorest.

Notwithstanding the variety of means employed, the cure of this formidable disease has never been satisfactorily accomplished. Paring and the application of caustic have been usually resorted to with some success. But the following mode of treatment is confidently recommended, having been found by experience to be perfectly effectual.

The sheep affected with foot-rot should be sorted in an open fold or bught, if the weather be dry; in a shed or house properly cleaned and spread with straw, if it be wet. A dry day should be chosen for the purpose if possible, and the house should be divided by a partition, one apartment being for the sheep that have undergone treatment. There should be two sorters, a third person to hold the medicine, and a fourth to take away the sorted animal and bring another. The sheep is laid on its back, either on a smearing-stool, or on the floor, and examined; the feet are carefully washed, pared, cleaned, and dressed with the following solution :

Corrosive Sublimate, three quarters of an ounce.

Sulphate of Copper, two ounces.

Verdigrise, one ounce and a half.

Alum, two ounces.

White Copperas (sulphate of zinc), one half ounce.

Muriatic Acid, two ounces.

Charcoal, three-fourths of an ounce.

Pound as small as possible, mix in half a bottle of the best distilled vinegar, and apply externally.

In all severe cases, and especially where the disease is the result of constitutional affection, two ounces of Glauber-salts, dissolved in half a mutchkin of water, should be given internally.

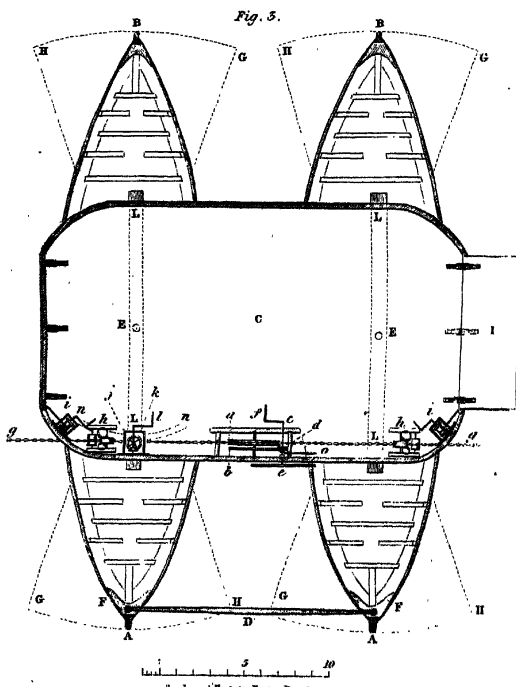
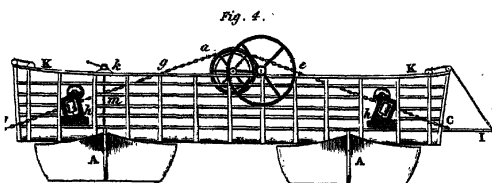
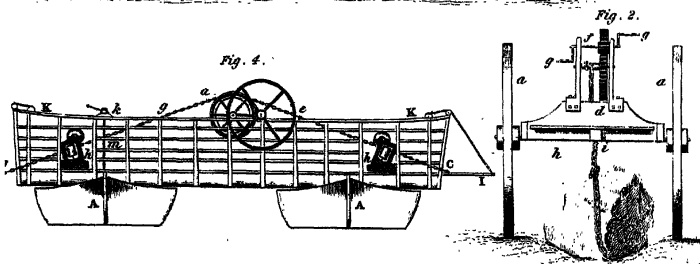
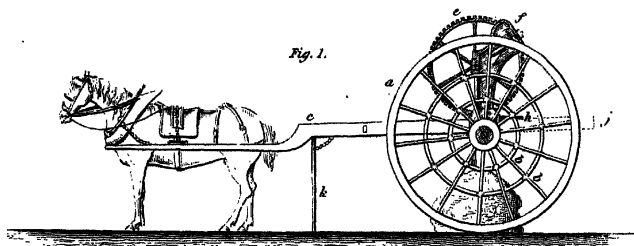
The sheep ought to remain in the house about four hours after having undergone medical treatment, and they ought to be let out by as clean a path as possible. After five days, those which have not been cured by the application should be again taken in. Some cases will occur in which the remedy must be repeated several times; but if the cleaning and paring are judiciously performed, and the solution properly applied, eight or twelve days at most are sufficient for the cure.

DESCRIPTION OF A MACHINE FOR RAISING EARTHFAST STONES,
AS APPLIED IN PRACTICE. *By W. FORBES ROBERTSON,*
Esq. of Hazlehead, Aberdeenshire.

MR ROBERTSON having been engaged for several years in the improvement of waste lands, where the principal obstacles were large and unmanageable earthfast stones, and these being in considerable numbers, his attention was directed to the procuring of the cheapest and most expeditious mode of accomplishing his object. After making trial of the various methods hitherto in practice, so far as had come under his observation, he had recourse to a combination, which, though not new in itself, is perhaps the first instance of its application to this particular purpose.

PLATE IV.
SLING CART AND FERRY BOAT.

High^d Sec. Pat. Vol. IX, p. 333.



The machine, which is represented in Plate IV. Figs. 1. and 2, is on the principle of a powerful crab, mounted upon a two-wheeled carriage. Fig. 1. is a side view, and Fig. 2. an end view from behind. The carriage wheels *a*, are about $7\frac{1}{2}$ feet in height, to admit of the stone being freely suspended under the axle, and are defended by two or three concentric slender rings of iron *b b*, attached to the inward face of the wheels, to prevent the stone from chafing the spokes. The shafts *c*, are connected by cross frame-work, after the construction of the common open cart, with the exception of the main bar *d*, as seen in Fig. 2, which in this case is made very strong, and to which the axle of the carriage is attached. On the upper side of the main bar is placed the frame-work of the crab: this consists of two cast-iron cheeks, strongly bolted to the main bar, and carrying a toothed wheel *e*, with a drum or barrel, on which the purchase-chain is coiled. The wheel is acted upon by the pinion *f*, which is turned by the application of manual power to the winch-handles *g*. The proportions of the machinery of the crab are such as to enable two men at the handles to raise a stone of three tons weight. A small platform *h* is attached to the main bar on which the two men stand who work the crab. The purchase-chain *i*, having one end fixed to the barrel of the crab, and a hook at the other end, completes the working parts of the machine. The auxiliary parts consist of a pair of common *stone-shears*, together with a sling chain of three or four yards in length, a pick-hammer, mattock, spades, &c.

When a stone is to be raised, the only preparation necessary is to expose, by digging, as much of it as will admit of the stone-shears getting hold, and, for this purpose, a small indentation is made on each side of the stone with a pick-hammer. The machine is then brought over the stone, the shears hooked on to the purchase-chain, and their hooked extremities brought to take hold of the stone, at the indentations made for that

purpose; the rest or prop K is also put under the shafts, to ease the horse, and keep the machine steady while loading. The crab is then worked by the two men at the handles, until the stone is raised from its bed, and to such height that the sling-chain can be passed under it; the purchase-chain is then *eased off*; the shears disengaged, and the sling-chain being now brought to embrace the stone, is hooked to the purchase; and, by again working up the crab, the stone is elevated till it swim clear off the ground. The substitution of the chain for the shears is necessary, in order to allow the stone to be raised sufficiently high; for, though the *shears* must be used in the first place to raise the stone from the ground, their length prevents it from being raised so high as to admit of transportation. The stone being in this manner suspended, its removal from the field is easy and expeditious.

From Mr Robertson's practice, it appears, that when the stones are prepared, by being dug about and marked for the shears, he is able to remove from fifty to sixty blocks, each weighing from one to three tons, to the boundary of a field of eight or ten acres in one day, and at an expense not exceeding one-half of what he incurred by any other method.

Note.—It must be allowed that much praise is due to Mr Robertson for this new application of a very useful machine; but it is proper to point out, that a similar machine has been many years in use, and applied to a variety of purposes, under the name of the *sling-cart*. It seems to have been originally brought out at Woolwich (at least so far as is known), where it has been long in use for the removal of heavy ordnance. At a later period it was very successfully adopted by Mr Stevenson, when engaged in the erection of his celebrated lighthouse on the Bell-Rock, for the removal of large stones in the work-yard at Arbroath. In these cases an additional and very useful appendage has been usually attached to it, in the shape of a perch, projecting from the hind

part of the cart body, as shewn by the dotted lines *j*, which represent a prolongation of the shafts to support the perch, and affording, at the same time, ample footing for the men at the crab. When the body to be suspended is longer in one direction than the other, the machine is placed longitudinally over it, and a chain, attached to the perch, is passed round the end of the body, and adjusted to carry such a portion only of the weight, as may just serve to keep it from swinging about, thereby adding greatly to the facility of removal and to the safety of the machine. It may also be remarked, that the stone-shears has never before, we believe, been coupled with the sling-cart, nor does it appear well adapted to this purpose. The common *Lewis* is much better, but the trouble attending the cutting of the hole in the stone, for the reception of the lewis, is too great to warrant its application in the case of clearing ground. We would, therefore, recommend the plain cylindrical plug of iron as a substitute for the lewis. This, when inserted into a simple jumper bore in a stone, to the depth of three or four inches, requiring only a few taps with a hammer to give it a degree of cohesion that will hold to lift many tons weight, is loosened again with a tap on the side of the plug. The principles of this exceedingly simple fixture have been illustrated by Mr Low, in a former volume.

DESCRIPTION OF A NEW FLY-BRIDGE, INVENTED BY *Mr JAMES FRASER, Mill-Wright, Dowally, Perthshire, for the Tummel Ferry.*

THE ferry-boat, or fly-bridge, which is here brought under the notice of the public, is the invention of Mr Fraser, who seems to have been for a considerable time engaged in the improvement of ferry-boats; since we find that, in 1821, he constructed one for the Caputh Ferry, on the estate of Sir A. Muir Mackenzie, Bart. In that boat a part of the apparatus now under consideration was applied, and the same descrip-

tion of machinery has been subsequently adopted in several other ferry-boats in that quarter; but it is only in the present year that Mr Fraser has completed his invention.

The boat now on the Tummel Ferry, and which is the subject of this article, may be described in a general way as a fly-bridge, consisting of two boats, placed alongside of each other, but separated to the distance of a few feet, and connected amidships by a platform, moveable on pivots, placed over the centre of each boat. The boats are also attached to each other by a connecting rod, moveable on two other pivots fastened to the stem-heads; being of equal length, and the connecting-rod equal in length to the distance between the pivots of the platform, the arrangement thereby takes the character and principles of a variable parallelogram, moveable on the pivots situate in the four angles. The platform and the connecting-rod form two of the equal sides, while the half length of each boat form the other two sides. An apparatus is provided, connected with one of the boats, for changing the relative position of the boats and platform. This is worked by a winch-handle above the platform, and, when the boats are required to take an oblique position in relation to the platform, the machinery for this purpose acting on the one boat in the first instance, has its effect communicated through the whole arrangement, by the principles of the parallelogram, and thus the bridge is prepared to receive the impulse of the stream either on the larboard or starboard side, as circumstances may require. The passage of the bridge across the river is guided by a chain stretched from the one bank to the other, and secured there. In this respect it partakes of the action of the common river ferry-boat, in which the force of the ferryman is applied directly to the rope or chain to haul the boat across, but in the case before us, a train of machinery is adapted to assist the ferryman. The chain being led along one side of the bridge, guided by pulleys, is made to pass over a grooved-wheel, or pulley, about three feet diameter, which is turned by the ma-

chinery afterwards described ; the friction of the chain in the groove of the wheel being sufficient to overcome the resistance of the bridge in its passage across the river. The fundamental arrangement, however, of the boats affords a more ingenious mode of giving motion to the bridge. This is by setting the boats in an oblique position to the stream of the river, the platform running at right angles, or thereby, to it, and hanging by the chain. If the boats are so placed as to receive the impulse of the current on the larboard bows, they will be moved gently to starboard across the river, when, by shifting their position till the stream impinges on the starboard bows, the bridge will return to the point from whence it started, and that without any assistance of manual labour. This motion of course cannot in all cases be obtained with sufficient celerity, as it depends on the velocity of the stream ; but in any case it must afford a considerable assistance to the ferryman in working across the river.

The bridge is represented in Plate IV. Fig. 3 is a plan of the platform and machinery, with the boats as they appear projecting from under the platform. A A are the stems of the boats, or that end which points up stream, B B the stern, C the platform, and D the connecting-rod. E E mark the place of the pivots in the boats, by which the platform is attached to them, and F F the pivots in the stem-head. E E and F F, therefore, form the angles of the parallelogram. In the figure, the boats are represented as at rest ; when they are brought into the position of the dotted lines G G, the bridge will move to starboard ; and, when brought to the reverse position H H, it will then work to larboard. I shews the hatch-door at one end of the platform, let down for receiving or discharging a cargo, the one at the opposite end being represented as folded up. The dotted lines L L shew the position of the longitudinal beams on which the platform traverses, and to which the pivots are attached ; these beams are supported on the thwart beams of the boat,

and are faced with iron to save them from chafing with the motion of the platform; their ends are seen jutting from under the platform. In Fig. 4. the same letters refer to the corresponding parts of Fig. 3, A A being the stems of the boats, C shewing the level of the platform, I the hatch-door folded down, and K is the bulwark or side railing. In reference to the working parts of the apparatus, *a* is the chain-wheel with a deep groove to receive the chain and cause friction, *b* is a spur-wheel on the same shaft, and *c* is a shaft carrying a pinion *d*, that works into the spur-wheel. On one end of the pinion-shaft is mounted a fly-wheel *e*, and on the other end the winch-handle *f*, to which manual power is applied; *g* is the chain which stretches across the river, and *h h*, two sets of pulleys, in frames of cast-iron, for keeping the bridge and chains in their proper positions; *i i* are two winches for the purpose of drawing up the hatch-doors at each end of the platform, when the cargo has been shipped; *j* is an iron-frame work, carrying a horizontal bevelled wheel *k*, which is acted upon by a pinion on the shaft of the winch-handle *f*. On the lower end of the bevelled wheel-shaft *m*, Fig. 4, and under the platform, there is a pinion hid from view in the figure, which works into a toothed segment of cast-iron, represented by the dotted arc *nn*, which is firmly attached to the beam L L under the platform. By the action of the latter part of the machinery, the two boats are brought to the desired angle with the stream, which puts the bridge in motion across the river. This angle varies with the velocity of the current, and is in practice determined from the experience of the ferryman. The lever *o* is adapted to disengage the pinion *d* from the spur-wheel when the bridge is worked by the stream alone.

For the greater facility of embarking and disembarking carriages, cattle, &c. there are *shores*, or moveable slips, mounted on wheels on each side of the river. These can be moved higher or lower on the bank, according to the state of the river, and can be adjusted to the level of the platform.

REPORTS ON COLLECTING AND PREPARING THE SEEDS OF
FOREST-TREES, THE MODE OF SOWING THEM, AND THE
TREATMENT OF THE YOUNG PLANTS; TOGETHER WITH
AN ACCOUNT OF A CHEAP METHOD OF PLANTING.

[IN 1830 the Society offered a premium for the best and approved Essay on the subject of collecting and preserving the seeds of Forest-trees suited to the climate of Scotland; the best method of extracting the seeds from the cones of the pine tribe; and the modes of sowing the seeds, and bringing forward the young plants until they are ready for being planted out. It was required that the most easy and economical mode of extracting, cleaning, and preserving, the various seeds, should be fully detailed; together with the operations connected with sowing them, the depth of earth by which they should be covered, the quantity necessary for a given space, and the subsequent treatment of the seedlings, attention being especially directed to the trees most valued for their economical uses. It was also directed that those forest-trees usually propagated by slips or layers should be included. Three Essays were received, to each of which a premium was awarded. Of these Essays, two, the one by Mr John Grigor, nurseryman at Forres, the other by Mr Alexander Grigor, seedsman at Elgin, agreed so nearly in their various details, that it has been found unnecessary to submit them both to the public. The former, therefore, has been selected, it being more copious, and the latter has been reduced to a tabular view of the quantity of seed, and of the distance of the plants from each other, the only important circumstances in which

the writers differ. The other Essay, by Mr Adam, is printed in a condensed form. To these Essays is appended a Report by Mr John Grigor, on a cheap method of planting moorland, for which the Society's silver medal was voted.]

ESSAY I.—*By Mr JAMES ADAM, W. S.*

IN attempting to supply the desiderata which have induced the Society to offer a premium for an approved account of the best modes of collecting the seeds of trees, and of their subsequent management, I shall draw chiefly from the results of my own observation and experience; for although many books have been written on the subject of forest-trees, little practical information respecting the objects in view can be obtained from them.

Much injury is often done to trees by the persons who collect their seeds, for which reason few proprietors are inclined to permit the operation to be conducted on their estates. It is, however, perfectly practicable to gather all kinds of seeds without damage to the trees. In ascending, a light ladder should be used, of sufficient height to reach those branches which may be strong enough to support the gatherer, who ought to put off his shoes, or use light and pliant ones, without nails or iron on their soles. He should ascend as far as he can with safety to the branches, and should then begin to collect the seed by pulling the twigs up towards him by means of a crooked staff. In this manner he should proceed downwards, putting the cones or seeds into a bag suspended over his shoulder, until the whole tree be cleared.

As the methods to be adopted in the subsequent management of the seed are nearly as various as the trees which produce them, it is necessary to devote a separate section to each kind.

1. *Common or White Larch. Pinus Larix.*—The seed of this valuable tree is ripe in Scotland about the beginning or middle of November; but the cones should not be taken off before the end of that month. The seedsman, having obtained leave from the proprietor of the trees, should accompany the gatherers, or have a careful overseer, to superintend the operation, which ought to be conducted in the manner briefly described above. If the cones be ripe, and gathered in dry weather, they will keep quite well by being spread out on an upper floor, where a free circulation of air should occasionally be allowed.

In the beginning of March the operation of extracting the seeds should be commenced. It is necessary first to kiln-dry the cones, and for this purpose a common malt-kiln, with a hair-cloth, or a kiln of a similar kind, may be used, the hair-cloth being generally supported on wooden frames, and a surface of about 14 feet square exposed. The cones being spread on the kiln to the depth of 12 or 14 inches, the fire is then applied, the fuel consisting of coke or charcoal. Some address is necessary here, for if the heat be applied slowly and uniformly, the scales of the cones become hardened without being raised. A brisk heat, sufficient to raise the thermometer in the kiln to 90° or 100°, should therefore be first produced. As the scales rise the heat is decreased, so as at the end of twenty hours to indicate 80°. During the next sixteen hours it should again be gradually raised to 90° or 95°. While on the kiln, the cones must be turned twice, the first time at the end of twelve hours, and again at the end of twenty-four hours.

At the end of thirty-six hours, the cones are in general sufficiently open and dry to part with the seed, and are carried to a thrashing-floor, and thrashed out before they have time to cool. The floor is formed of causeway or paving stones, rather smaller than those generally used for paving streets.

About eight imperial bushels of cones are taken from the kiln to the floor at a time, and thrashed by four or six men with common flails. The thrashing is continued by some seedsmen for about two hours, and the seed then winnowed by a pair of common corn-fanners, to separate the chaff; but it is better to remove the seed from time to time, which saves it from injury. After the thrashing has been continued for thirty or forty minutes, the seed is passed through a riddle or sieve similar to that used for oats. The cones being drawn aside, and the seed removed, another floor of cones from the kiln is put down, and the cones of the first floor are put in the centre of the floor, where the flail does not fall too heavily. They thus receive an additional thrashing along with the fresh cones, of from thirty to forty minutes longer; and the operation is thus continued till the whole kilnful, which generally consists of about five or five and a half quarters, is thrashed off. What remains not perfectly thrashed is kept for the next kiln, and is again heated for ten or twelve hours along with the first cones.

The seed is then winnowed in a pair of corn-fanners, when it is put through a wire sieve, and afterwards twice through a finer sieve. These operations are performed as quickly as possible, and are finished before the heat is entirely gone.

After this treatment, the seed appears shrivelled, and to restore its natural appearance is subjected to the following operations: The whole seed obtained is put into a heap, and damped by being sprinkled with water, it being at the same time turned over by the hand. The quantity of water applied is 12 imperial pints to each 112 lb.; and if one-sixteenth of that quantity of common green or rapeseed oil be added, the plumpness of the seed will be increased. After the water has been added, the seed is allowed to remain about three hours in the heap, after which it is again put through a sieve and spread out about three inches deep. When completely

cooled, it is put up in bags and laid in a dry airy place. If the cones are good, one kiln of about five or five and a half imperial quarters should produce 224 lb. of seed.

In conducting these operations great care must be taken that the kiln be not overheated, and that too much moisture be not applied to the seed. A heat of from 130° to 135° of Fahrenheit, is found to destroy the vegetative principle in larch seed; and for this reason, the temperature should not, in any part of the process, be allowed to reach above 110° or at most 115°.

The trees fittest for producing healthy seed are those in the full vigour of growth, from twenty to forty years of age, and standing in an airy situation, on a dry healthy soil, at an ordinary elevation, not exceeding 400 feet. The seed produced in Perthshire, particularly about Kenmore, Dunkeld, Drummond Castle, Abercairney, and Scone, is superior to that obtained in the south of Scotland or in England. If one seed in five be good, the quality is reckoned a fair average; if one in four be sound, it is reckoned excellent. In bad seasons, however, one good seed in twenty is often not obtained. The larch seed procured from the continent is larger than that obtained from the trees in Scotland.

To give vigour to the young plant of home seed, it is found necessary to prepare the seed-bed; and this should be done with cow-dung well rotted and thoroughly mixed with the soil. The ground is prepared for the seed-beds by frequent digging, and thereby intimately mixing the dung during the previous autumn and winter, and again in March or April, or by a crop of potatoes or green crop, very richly dunged the previous year. The first sowing may commence about the middle of April; another may take place in the first week of May, and a third ten days thereafter. The soil best adapted for larch seed-beds is a light friable rich earth.

The seed-beds should be 42 inches in breadth, and 20 yards in length, or of any other suitable length, with intervals of 18

inches. The ground must be raked fine, and the earth may be pushed equally to each side of the bed by a wooden-headed rake with iron teeth, in quantity sufficient to cover the seed to the depth of one quarter of an inch. The seed is then sown by the hand, from 12 to 20 lb. being put on each bed, according to the quality of the seed, so that each square yard may produce about 2000 plants. After the seed is sown, the beds are smoothed and compressed, either with a light roller or the back of a spade, and the mould is then pulled back over the seed with the rake. A dry day should always be chosen for sowing, and the ground should also be in a dry state, as otherwise the surface is apt to cake. If the crop of seedlings prove good, there ought to be nearly 2000 on each square-yard, and the first year's growth should reach from 5 to 6 inches above the surface.

Early in the month of March, from one-third to one-half of the larch plants may be picked out by the hand, and transplanted by the dibble in rows ten inches distant, placing them four inches distant in the row; and the remainder may be left in the seed-bed for another year, when they will be ready for planting out on bare ground. After being transplanted, the larches may remain in the nursery for one, or two, or three years, according to the size required for planting out. This depends upon the nature of the ground on which they are to be placed, and a general rule is, that the plants should be high enough to outstrip the herbage.

If the two-year old seedlings are to be transplanted into the nursery, this may be done any time from November to March. They may be placed in lines 10 inches apart, the plants from 4 to 6 inches separate. The dibble, however, ought not to be used, but a small trench should be formed along the line, deep enough to receive the roots, and formed vertically. The plants being then placed in a row, the earth is drawn up against them and compressed.

The fall of the year is to be preferred for planting out

larches, as in elevated situations it often happens that vegetation has proceeded too far in spring before the frost will allow them to be planted. As soon as the leaves fall off, the operation is to be commenced. The latter part of October and the whole of November, will be found the best season, especially in dry soils. What cannot be planted in November should be finished in February; but in dry soils, and in open weather, the planting may be continued through the winter. Plants to be sent to a great distance should be taken up dry, and packed in hampers without straw, their tops being placed against the sides of the hamper, and their roots against each other.

2. *Scotch Fir or Pine. Pinus sylvestris.*—The seeds of this tree are gathered at the same time, and in the same manner as those of the larch. It requires a heat of upwards of 150° to destroy their vital principle. After the cones are put on the kiln, the heat may be raised to 90° or 100° . When they have lain eighteen or twenty hours, they should be turned once, and in ten hours after they will be sufficiently opened. They do not require regular thrashing, but may be put into bags, and receive a few strokes from the flail, when the seeds are put through the fanners, and once through a narrow sieve. The seed is then put into the heap, and watered and mixed like the larch seed, but one-third of the water necessary for the latter is sufficient for it. After standing one hour in the heap it should be spread out to cool, and then put into bags.

About $11\frac{1}{2}$ quarters of cones yield 112 lb. of seed; and if the seed be good, a far greater proportion will vegetate than in the case of larch. Three pounds of seed are sufficient for a bed 20 yards long and $3\frac{1}{2}$ feet broad. The seed is put in and covered to the same depth as that of larch, and about the same time, or a week or two earlier. The best seed is obtained from the natural forests in the north, especially those on the Spey and the Dee.

Scotch fir must stand two years in the seed-bed, after which it is to be transplanted into rows of 9 inches apart, the plants 3 inches from each other. After standing one year, it may be planted out, unless large plants are required, in which case it should remain another year. The season both for transplanting and for planting out commences early in November, and, should the weather be favourable, may continue till April.

3. *Norway Spruce. Pinus Abies.*—The seeds of this tree ripen in Scotland, and are treated in all respects like those of the Scotch fir. About $8\frac{1}{2}$ quarters of cones produce 112 lb. of seed. The best seed, however, is procured from Hamburg. The quantity necessary for a bed 20 yards in length by $3\frac{1}{2}$ feet in breadth, is three pounds: the period of sowing is early in April. The plants must stand two years in the seed-bed, and two in the nursery. They may be taken from the seed-bed in favourable weather, from November to April, and placed in rows in the nursery, with 10 inches between the lines, and the plants 3 inches apart. The planting out may continue till the middle of April.

4. *Silver Fir. Pinus Picea.*—In good seasons, the cones of this fir ripen with us. They are of a large size, and readily part with their seeds, which may be obtained by turning them over from time to time on a dry floor. About $5\frac{1}{2}$ quarters yield 112 lb. of seed. The seed is sown like that of the spruce, but when the plants are removed at two years into the nursery, they require a greater distance between the rows, which may be 12 inches apart. They should be planted out after one, or at most two years of the nursery.

5. *Weymouth Pine. Pinus Strobus.*—The seeds are extracted, sown, and covered in the same manner as those of the Scotch fir, but being more delicate, the seed-bed should be covered with nets or mats in the heat of the day. They must remain two years in the bed, and when transplanted

they may be placed in rows 12 inches asunder, the plants being 4 inches distant from each other.

6. *Cedar of Lebanon. Pinus Cedrus.*—In favourable seasons, the seed of the cedar ripens in this country, but it is better to procure it from the Levant. The cones are generally opened by splitting them with a wooden peg driven into their base, through the centre. They are then put into water, where they remain for a day, and another peg rather larger than the first is driven into the hole, so as to split the cone, when the scales may be removed, and the seeds picked out. The soil in which the seeds are to be sown should be of a light nature, and put into pots or boxes, where the seed may be covered to the depth of nearly half an inch. When the plants come up, the pots should be removed into the shade, but so as to receive the rain, and watered now and then when necessary. In winter they should be sheltered by mats, or removed into the greenhouse. They may be kept either one or two years in the pots. In the beginning of April, the plants may be pricked out in rows, distant one foot, the plants standing 4 inches apart; and if the weather be dry, they should be shaded and watered till they take root. They may remain in these beds for two years, when they may be transplanted into the nursery.

7. *White American Spruce. Pinus alba.*—The seed is easily separated from the cones, it being only necessary for that purpose to spread the latter on a dry deal-floor, and turn them from time to time during the winter. The seeds are sown, and the plants managed, in all respects like those of the Norway spruce.

8. *Black American Spruce. Pinus nigra.*—It is necessary to put the cones of this species on a kiln, and raise the heat to 130°. In three hours they will be ready to be taken off, and they must be thrashed while hot; the subsequent management is the same as for the Norway spruce; but it is an improvement to have a little peat-earth mixed with the soil.

9. *Oak. Quercus Robur*, and *Quercus pedunculata*.—The acorns are generally procured from London, and are produced in the county of Kent, and other southern districts of England. The brightest and most weighty are the best, and they should be spread out on a deal-floor till the time of sowing. English acorns produce plants decidedly superior to those obtained from Scotch. They should be sown early in February in drills, one foot apart, formed by a garden-hoe, and covered two inches deep. After the first season, they may be transplanted into the nursery in drills, 16 inches apart, the plants being 4 inches from each other; and here they may remain one, two, or three years, until they acquire the requisite size. For many soils, however, where the herbage does not grow luxuriantly, two-years seedling oaks will answer perfectly; and for this purpose the seedlings may remain in the drills for two seasons. It is an approved practice to cut with a spade the roots of the seedlings of one year intended for planting at two years old, without removing them from the drills.

10. *Evergreen Oak. Quercus Ilex*.—The acorns are procured from London, and the several varieties of this tree are treated in all respects like the last.

11. *Ash. Fraxinus excelsior*.—Ash-keys should be collected in December or January, and laid in heaps mixed with one-third part in bulk of sand, under cover. The heaps should be turned three or four times in the course of the following year, and the seeds will be ready for sowing in March, after having been kept thirteen or fourteen months. If more convenient, however, they may be put in pits dug in dry ground, and mixed with sand. The seed should be sown in beds $3\frac{1}{2}$ feet in breadth and 20 yards in length, which require three imperial pecks. The covering should be $1\frac{1}{4}$ inch in depth. They may be planted out from the seed-bed after two years, or if large plants are required, they may be prepared in the

nursery in drills 18 inches asunder, and the plants 6 inches distant from each other.

12. *Broad-leaved or Scotch Elm. Ulmus montana.*—The seed is ripe in June, and must be sown soon after it is collected. When the seed has been gathered, it may be spread out three or four days to dry, and in that state two imperial bushels will be sufficient for a bed 20 yards in length, and $3\frac{1}{2}$ feet in breadth; but if the seed-bed be dry, and the seed can be sown without being dried, one bushel will suffice. The mould should be made fine, and the covering should be one inch in depth. If the weather be dry, the beds may be occasionally watered. Some recommend that they should be sheltered from the sun by mats supported upon hoops; and, at all events, it is necessary to cover them with mats, to keep them from the birds. In October, or the subsequent spring, the plants may be removed to the nursery, and placed in rows 18 inches asunder, the plants being 6 inches apart.

13. *Small-leaved or English Elm. Ulmus campestris.*—This species is not raised from seed.

14. *Beech. Fagus sylvatica.*—Beech-mast should be gathered in September or October, and spread out on mats, in an airy place, to dry, for five or six days. It may then be put up in bags till the following March. It should not be sown before the last week of that month, or the first week of April, a bed of the dimensions formerly stated will require no more than half a bushel, which may be covered to the depth of an inch and a half. After standing two years, they may be transplanted into the nursery, in rows 18 inches asunder, the plants 6 inches distant in the rows.

15. *Sycamore or Plane. Acer Pseudo-platanus.*—The seed may be gathered in October, and either sown in a few days, or kept dry till March, and then sown in beds, prepared as directed for ash. In the following spring, they should be transplanted into the nursery in rows 18 inches distant, the plants 6 inches apart. If they are intended to remain for a

large size, the distance may be 3 inches more both between the rows and the plants.

16. *Oriental Plane. Plantanus orientalis*.—The seeds of this tree seldom ripen in Scotland, and are procured from the Levant. They are treated like those of the sycamore. The species is also propagated by cuttings and layers, but the layers are most to be depended upon, and a sufficient number should be planted out for stools, in good loam prepared for the purpose. After standing for one year, the layers should be earthed down in autumn with a little nick at the joint; and a year thereafter they may be separated and planted out into the nursery, where they may stand two years.

17. *Occidental Plane. Platanus occidentalis*.—This is raised by cuttings taken from strong young wood, and planted early in autumn, in a moist good soil. The shoots may be planted in rows 18 inches distant, standing 6 inches in the rows. By this means they will acquire sufficient size to be planted out without being removed into the nursery. It may also be raised from seed procured from America.

18. *Sweet Chestnut. Fagus Castanea*.—The seeds of this species ripen in England, but those from Spain and Portugal are better. In February plant them in drills a foot distant, and 4 inches deep; place the seeds 4 inches asunder, and cover them well. After standing two years, let them be transplanted in March into the nursery, in rows 18 or 20 inches asunder, the plants 8 inches from each other.

19. *Horse-Chestnut. Æsculus Hippocastanum*.—Dry the nuts sufficiently to keep for conveyance, and when they part with their outer husk, they are ready for planting. Put them in a tub of water, reject those that float, and plant in the same manner as chestnuts, but in October. When the plants are a year old, remove them to the nursery, where the distance of the rows may be 18 inches, and of the plants 6 inches.

20. *Birch. Betula alba*.—The seeds should be collected

from the variety called the Weeping Birch, it being of the quickest growth, and most elegant appearance. They should be sown a few days after being gathered, and covered about half an inch thick; or they may be sown on moist soil, tramped into it by the foot, and covered with the spray of the spruce-fir. One half bushel will serve for sowing a bed. After remaining one summer in the seed-bed, they may be planted out into the nursery in rows, 15 inches asunder, the plants 5 inches from each other in the lines.

21. *Alder*. *Alnus glutinosa*.—The alder is treated in all respects like the birch. Three pounds of seed are sufficient for a bed. In England, however, it is usually propagated by layers.

22. *Hawthorn*. *Crataegus Oxyacantha*.—The haws should be gathered in September and October, and being mixed with one-third of their bulk of dry earth, may be buried one foot thick in a dry trench, and covered to keep out the wet; or they may be mixed with sand or dry earth, and put in heaps, covered to protect them from frost. After remaining thus for two winters and one summer, they may be sown in March, in beds, and covered to the depth of an inch and a half. A bushel and a half may be sufficient for a bed. Having stood a year in the seed-bed, let them be pricked out in rows one foot apart, the plants 4 inches distant in the row. Two years after, they will be ready for being planted out.

23, 24. *Mountain-Ash*, *Sorbus Aucuparia*; and *White-beam*, *Sorbus Aria*.—The berries may be treated like those of the hawthorn, or they may be sown soon after they are ripe; but in the latter case, many of them will not appear till spring. After standing a year in the seed-bed, they may be transplanted into rows 15 inches apart, the plants 6 inches distant from each other.

25. *Hornbeam*. *Carpinus Betulus*.—The seeds are prepared and treated in all respects like those of the hawthorn

and mountain-ash. After being one year in the seed-bed, they may be transplanted like the latter.

26. *Holly. Ilex Aquifolium*.—The seeds may be collected during the winter months, and prepared and treated in all respects like those of the hawthorn.

27. *Elder. Sambucus nigra*.—The seed is prepared like that of the hawthorn; but as it is generally of good quality, and does not require to be sown thick, six or seven ounces are sufficient for a bed. It may also be propagated by cuttings.

28. *Swedish Maple* is sown and treated in all respects like the mountain-ash.

29. *Laburnum. Cytisus Laburnum*.—The seeds are rubbed out of the pods by the hand, and may be sown in April, two pounds being sufficient for a bed. They are ready at one year to be transplanted into the nursery.

30. *Lime. Tilia europæa*.—The seeds may be gathered in October and November, spread in an airy place to dry, and sown in a few days after. The beds are prepared in the same manner as for larch. About ten pounds of seed are sufficient for a bed. When the plants are two years old, they are removed to the nursery, and planted in rows 18 inches asunder, and 6 inches distant from each other. The lime is frequently propagated by layers, as its seed does not always ripen with us.

31. *Poplars. Populus*.—All the species of this genus, except the *Populus alba* and *P. canescens*, are propagated by cuttings. Vigorous shoots of one year old should be cut in autumn, carried home in bundles, and divided, in wet weather, into lengths of eight inches, to be planted in March or April. The rows may be two feet asunder, and the plants six inches distant. After one year, they will be ready to be planted out for large plantations; but for ornamental planting, they may remain till they attain the requisite size. The Canada or Ontario poplar will be found to be the most profitable of any

yet raised in this country, as it grows very fast, and attains a large size. It is difficult to raise the *Populus alba* and *P. canescens* from cuttings; but as they send out roots near the surface, from which young plants arise, these plants are pulled up, and their small roots cut into lengths of about an inch, which are set in beds. Each cutting will produce five or six plants, which, after one year, may be transplanted like those species raised by cuttings.

32. *Willows. Salix.*—All the useful species are propagated by cuttings. In the small kinds, cuttings of two years' wood should be selected, and should be about eight inches long, six inches being put into the ground, and two inches left above it. The distance of the plants from each other must be regulated by the size which they attain, the larger kinds, such as the Huntingdon Willow, being planted nearly at the same distance as the poplar, and the other kinds in proportion.

ESSAY II.—*By Mr JOHN GRIGOR, Nurseryman, Forres.*

THE seeds of some of the trees adapted to the climate of Scotland require no particular care in preparing them for sowing, while others must be pitted during the winter, and sown at a period when they may be exempt from injury. But of all the different kinds, none require so much labour as those of the pine tribe, with which it may therefore be expedient to commence our remarks.

The cones of the *Scotch Fir* are not considered ripe until they have changed from a deep green to a grey colour, which is occasioned by frost, and usually happens before the end of January. They may be collected between the beginning of February and the 10th of April, after which the weather usually becomes so warm, that the scales open and the seeds fall out. Young and vigorous trees produce the best cones. When old trees stand in exposed situations, their lower branches

are frequently loaded with cones, which, however, although easily procured, are of a quality much inferior to that of the cones produced by the higher branches.

If only a few pounds of seed are required, they may very easily be extracted without the aid of artificial heat, if the cones have not been gathered before the middle of March. In the end of April, spread some matting or canvass in a warm situation in the sunshine, lay the cones upon them about three or four deep, and in the course of two or three days they will be sufficiently opened. They should then be riddled, that the seeds may be shaken out. This is the safest way of extracting fir seeds, but it is too tedious when a large quantity is required.

Great attention is necessary in kiln-drying fir-cones, to prevent the accumulation of heat to such a degree as to destroy the vital principle of the seeds. With brick or metal kilns, it is scarcely possible to keep many of the seeds safe, as on falling from the cones they are liable to be scorched, and the only kind of kiln adapted for the purpose is one floored with deal. The planks should be about two inches broad and two thick, with half an inch of a vacancy between them. When they are broader or closer, there should be holes bored in them to admit the heat regularly. Between the kiln-head and the apartment where the cones are kept, is a door opening towards the former, by which the kiln is easily filled. The cones should be spread six or seven inches deep on the kiln-head, and they require a heat of from 125° to 130° of Fahrenheit's thermometer, continued for about thirteen hours. This degree of heat may be applied with perfect safety, but care must be taken that it be not raised higher, in which case there is danger of destroying the seeds. Supposing the process to commence at six in the morning, the kiln is allowed to cool for half an hour, at noon, when the cones are turned with a spade or shovel, so as to place the close ones at the bottom, and the open ones at the top. Some of the seeds will fall down into

the pit, and before the fire is again kindled, must be swept together and taken out. The fire should then be continued until about six, when the kiln should be cooled a second time, and the cones turned, when they will be found nearly all open. The seeds are to be taken out of the pit as formerly, and heat again applied until about eight o'clock, when the drying process is completed. The cones should be left on the kiln till next morning. The sides of the kiln being oblique, and the bottom narrow, and placed considerably below the fire-place, the seeds which fall receive no injury.

In the morning, the kiln is emptied and again filled; and after the first kilnful has been prepared, the empty cones may be used as fuel. When the seeds are riddled out of the cones, they present the appearance of a heap of uncleaned oats, and to break off the chaff or wing, they require to be well rubbed. For this purpose, they should be put into a sac, and trodden with the feet. If the seeds are to be immediately sown, the best way to clear them of the chaff is to wet them with water, turning them over, that none of them remain dry; but if they are to be kept for some time, they should not be wetted, as they are then apt to become mouldy. If they do not get too much water, they will be fit for dressing in five or six hours. They should then be exposed to the wind, and riddled, first through a wire or cuffing-riddle, next through a barley-riddle, and lastly through a fir-seed sieve, which should be of a size large enough to let through the seeds slowly, so that the wind may purify them in the sifting. The sand should then be sifted out of them with a common meal-sieve. This mode of cleaning is adapted to seeds that are rubbed, as well as to watered seeds.

To ascertain whether the seeds are safely manufactured, it is only necessary to split some of them after they have been damped for a few hours, when the appearance of the kernel and central sprout will indicate the soundness or destruction of the seed. Scotch fir-seeds keep best without being manu-

factured. In this state they may be preserved four or five years, if the cones are kept dry. When they are manufactured, and it is necessary to keep them, they should be mixed with dry fir chaff, and put into a bag or cask, in a dry situation.

The mode of preparation above detailed is equally applicable to the seeds of the Norway Spruce, American Spruce, Silver Fir, Pinaster, Dwarf Pine, Weymouth Pine, and Cedar of Lebanon. The seeds of most of these species, however, are larger than those of the Scotch Fir, and in being cleaned only require to be rubbed or damped, and then winnowed.

Larch cones may be collected any time between the beginning of December and the end of April, and are more easily manufactured after they have been severely frosted. They should be gathered from young and healthy trees, or from the top branches of old trees which are not infected with blight or smut. They require to be kiln-dried for twelve hours, with a heat of 120° or 125°, then taken warm from the kiln, laid upon a floor made of small stones for the purpose, and thrashed to pieces, before the seeds can be procured. *Larch cones* are frequently dried on brick or metal, and are then very readily broken, but the seeds seldom escape without material injury. The thrashing should not be continued long without the seeds and dust being sifted out from among the cones on the floor, as an accumulation of them hinders the operation.

When the seeds are extracted from the cones, they should be exposed to a steady wind, which will at once carry off the greater part of the dust. They are then put through a barley-riddle, and a sieve wide enough to let them pass slowly before the wind; and lastly, they should be sifted in a common meal-sieve, to free them from sand. They cannot be dressed so clean as the seeds of other firs, because in thrashing, the small fragments of the cones are so intermixed, that it is impossible to separate them completely.

Alder cones are generally ripe in October. When col-

lected, they should be spread thinly on a loft floor, where they should remain to dry, as the scales must separate before the seeds fall out. When the cones open, they should be gathered together, and trodden with the feet, which will cause the seeds to come out. The seeds, after being cleaned, should be put into a sac, where they should remain till the end of March, when they are to be sown.

Mode of sowing the Seeds of Trees.—The ground after being dug, should be smoothly raked. Beds should then be lined out, of the breadth of four feet, with alleys one foot in breadth between them. The best mode of sowing tree seeds of any kind, excepting birch and alder, is by *cuffing* the beds. This operation is performed by a wooden-headed nursery rake, with its teeth placed upwards, by means of which one-half the breadth of the bed is moved over into the alley on the one side, and the other half into the other alley, the earth of each side being made to stand up perpendicularly on the brink of the bed, so that the space intended for the seeds be exactly four feet wide. The cuffing of seed-beds should not always contain the same quantity of earth, but should be proportioned to the depth of covering required by the seeds. Large seeds, such as acorns, beech-mast or chestnuts, should be rolled down, or beaten in with the back of a spade, which prevents them from moving out of their places in the covering. Before seed-beds are covered, a mark should be placed exactly at the corner of each bed, that, after covering, its limits may be known with accuracy. The cuffing should then be drawn in with the teeth of the rake, and made to re-occupy the space from which it was preparatorily removed. Seeds of all kinds should be covered deeper in dry than in damp ground; and some kinds of seeds require more covering than even a heavy cuffing, in which case the ground from the alley must be spread over them with a spade, and then smoothly raked.

Transplanting into Nursery Lines.—Two modes of trans-

planting, which are commonly named *Natching* and *Dibbling*, are practised in nurseries. Plants thrive best under the former method; the latter answering well only for cuttings. If great care is not employed in dibbling plants, their small lateral roots are apt to be bent upwards; and in firming the plants in the ground, by making a hole with the dibble close to their roots, they are very apt to be confined too much. Dibbled plants never grow so well as those that have been natched, and the reason is probably because the roots of the latter are better spread.

If ground intended for plants is in a poor state, it should be manured with short well-rotted dung. Commence at one side by turning out an opening. Then dig on a stamp of earth, making it quite smooth and flat. A line being fixed along this newly dug ground, exactly in the place where the first line of plants is to grow, a natch should then be cut out with a spade, close to the line, from the one end to the other. In doing this, it is of importance to make the earth stand perpendicular, in order that the plants may stand erect. The natch should be made deep or shallow, in proportion to the length of the roots of the plants for which it is intended; and when it is prepared, the plants should be placed against it, at their proper distances, observing that if there be a great inequality, as is generally the case with seedling plants, they should be put into two or three sizes, and each size planted by itself. The roots of all the seedling hardwood trees should be pruned, and when transplanted they should be placed a little deeper in the ground than they formerly were in the seed-bed. They should be placed in the natch with one hand, and a little earth applied to the roots with the other, to keep them up. A small stamp of the loose earth, which was cut out of the natch, should then be laid to their roots, and gently tramped, in order to firm them. Another larger stamp should then be turned on, observing that it does not cover any of the plants. This stamp should be made le-

vel with the ground dug before the natch was cut out, and it should be broad or narrow in proportion to the distance to be left between the lines. If these are very broad, more than one stamp will be required. The line is then to be set for the natch that is to contain the second row of plants, and so on till the piece of ground is filled.

On growing Scotch Fir.—The seeds should be damped about twenty-four hours before they are sown. They grow well in ground manured with rotten leaves, which may be gathered in woods. The usual time of sowing is the end of April or beginning of May. One pound of seeds is sufficient for sowing ten yards of a bed four feet broad. The covering, in moderately damp soil, should be half an inch thick; in dry ground it should be thicker. In about ten days the young plants commonly make their appearance, when the beds should be carefully looked over, and any lumps of earth that may confine the plants removed. The beds should be weeded, but not in very dry weather. After being two years in the seed-beds, they are fit for being natched out into moor-ground. When they are required stronger than two years seedlings, they should be transplanted into nursery lines, which should be nine inches apart, the plants being about two inches distant. If the roots are pruned in transplanting, they will not thrive so well as those that are planted out with the roots entire. It may here be mentioned, that the variety which produces the best trees, is that of the natural woods of Abernethy in Strathspey, Braemar, and other districts of Scotland.

Spruce Firs.—The mode of treatment is the same as that of Scotch fir; but one pound of seeds is required for six yards of a bed four feet broad. Spruces are generally transplanted when they are two years' seedlings, but are sometimes allowed to remain three years in the seed-bed. They should be transplanted into lines one foot apart, the plants three inches distant from each other. When they have been two or three

years in line, they are fit for being planted out; but if required stronger, they should be transplanted a second time, a larger space being left between the plants.

Pinaster and Weymouth Pine.—The seeds should be damped for a little time previous to their being sown. They thrive best in a dry sharp soil, manured with vegetable mould composed of decayed leaves of trees. The middle of April is the proper time for sowing them. One pound of seeds is enough for ten yards of a bed four feet wide. The cover should be one inch thick. In the following April they should be transplanted, when they are to be placed in lines eight inches apart. They thrive best when laid quite close to each other in the lines. When they have remained one year in the lines, they should be again transplanted, and a greater space allowed for them. In another year they will be well-rooted plants, fit for going out.

Silver Fir, and Balm of Gilead Fir.—The seed should be sown about the middle of April, at the rate of one pound to about eight yards of the bed, with nearly an inch of covering. The seedlings do not admit of being transplanted until they are two years old, when they should be placed in lines one foot apart, the plants three inches distant. When they have been two or three years in line, they should either be put out, or replanted in nursery lines, for the purpose of keeping the roots in a proper state.

Cedar of Lebanon.—In the beginning of April, the seeds should be sown in large pots or boxes plunged into the ground in a warm and sheltered situation. The soil should be rich, but with a considerable mixture of sand. The seeds should be placed about half an inch apart, and should be covered to the depth of one inch. When three years old they should be transplanted into pots, lifting them with as much earth as will adhere to their roots. The pots should be about five inches wide, and sunk in the ground, which will prevent them from requiring much water, except in dry weather.

The month of April is the best time for transplanting them. When they have been two years in pots, they should be transplanted into the open ground.

Common or English Oak.—Acorns are ripe about the beginning of October, when they fall from the tree, and are easily collected, if the ground is clean underneath. When there is grass or heath around the trees they should be pulled in the end of September. Although acorns ripen in Scotland, they are not of so good quality as those grown in England. After being gathered, they should be spread out on a loft-floor to dry for two or three months. They may be sown any time before the end of March; but when sown in the end of December or in January, they generally produce the best plants. Acorns will grow in any soil, but that best suited for them is a deep loam, which ought to be well manured, and dug deep. One bushel is sufficient for 25 yards of a bed four feet wide. They should be covered to the depth of an inch and a half. After remaining two years in the bed, they should be transplanted into lines about sixteen inches apart, the plants four inches from each other. The roots should be pruned. When they have been two years in the lines, they are generally fit for being planted out. Some prefer planting them at three years, but when they are allowed to remain so long in the lines, they begin to strike deep into the soil, and lose that bushiness of the roots which frequent transplanting is so useful in producing.

Evergreen and Scarlet Oaks.—The seeds of these trees should be sown from November to March. They should be put into warm borders of early soil, and sown at the rate of a bushel to 35 yards of a bed four feet wide, with a covering one inch deep. When one year old they should be transplanted into lines about eight inches apart, and placed at the distance of one inch from each other. When five years old, after being twice transplanted, they are fit for being planted out.

Ash.—The seeds of the ash should be collected from healthy trees, as soon as the leaves fall, which is commonly about the end of October. They should be put into a pit in dry ground, and mixed with sand or earth, to prevent them from heating. In this state they lie for a year, when they may be sown any time before the end of December. Half a bushel of seeds will sow fifteen yards of a bed four feet wide. The young trees should be transplanted when one year old, into lines sixteen inches apart, the plants about four inches from each other. When transplanted two years, they are usually three feet high, and may be planted out.

Wyeh or Scotch Elm.—The seeds are generally ripe in the second week of June, when they assume a brown colour. They should be sown immediately after they are collected, and as there is no way of separating the good from the bad seeds, the beds should be covered with them. The covering of earth should not be more than an inch thick. Seedling elms grow best in a rich early soil. The beds should be watered in the evenings of dry days, so that the seeds may be kept moist for a week or ten days, when the plants make their appearance. The stoutest of the plants will be fit for transplanting in February or March. This is the usual way of treating elms; but the seeds after being gathered in June, are by some kept on a loft, and sown in March; but it is difficult to preserve the seeds, and the young plants are often so tender, that the frosts injure them materially in April. In transplanting them, when one year old, they should be placed at the distance of from three to four inches, in lines fourteen inches apart. The lines of two years' seedlings should be about eighteen inches wide. The roots should be pruned with a sharp knife. Elms are commonly fit for going out when two years transplanted. In lifting them, those that may be considered too small should be laid aside, and replanted into lines, at a greater distance than they formerly were.

English Elms are grown from shoots.

Beech.—There are few trees better suited to our climate than the common beech ; but although it grows freely, and attains a great size, it very seldom produces seeds equal to those grown in England. When beech-mast is ripe, it falls from the tree, and if the ground is bare, may easily be swept together. It is generally gathered about the end of October, and should be exposed to the wind, or put through fanners, that the empty seeds may be removed. It should be kept spread out on a loft, and frequently turned. The period of sowing is the end of March. One bushel is sufficient for forty yards of a bed four feet wide. The covering should be from one to one and a half inches thick. If beech plants are intended for hedges, they should be transplanted when one year seedlings, into lines fourteen inches apart, the plants four or five inches separate, room being thus given them to branch from the surface of the ground. When intended for trees, they should be transplanted into nursery-lines when two years' seedlings. The season for transplanting seedlings depends on the soil: if it be dry, the end of the year will answer best ; but if otherwise, February or March is the proper time. Two years' seedlings should be put into lines twelve inches apart, the plants three or four inches from each other. They will then require to be kept clean for two years, after which they are fit for being planted out.

Purple-Beech.—This very ornamental tree is most successfully propagated by inarching in the following manner:—When a purple-beech is to be had with its branches spreading on the surface of the ground, common beech plants, two years transplanted, should be planted all round at the extremities of the branches, in such places as the young twigs of the purple-beech can be inarched on them. The end of March is the best time for performing this operation, but the young plants should be inserted in a healthy state a year previous to the inarching, that they may have a good hold of the

ground. When the plants have stood one year inarched, they should be planted out into deep rich ground, at the distance of two feet each way, and in two years they will be fit for going out.

Sycamore and Swedish Maple.—The seeds of these trees are generally ripe about the end of September. A step-ladder should be used in gathering them, as the branches are very brittle. When collected, they should be spread on a loft for a few days, until they dry. They may then be put into less space, and should remain until the middle of March, when they are to be sown out in beds of the usual breadth, at the rate of a bushel to twenty-four yards. They should be covered an inch in the ground. When beginning to appear, the young trees should be protected from severe frosts by mats. They should be transplanted into lines, when one year's seedlings, unless they are quite thin in the seed-beds, as, on account of their large leaves, they are very apt to be hampered. One year's seedlings should be transplanted into lines 14 inches apart, the plants 4 inches separate. When two years transplanted, they are generally fit for going out. If not, they may remain another year, and then either put out, or replanted into lines, which will preserve their roots from getting too bare.

Variiegated Sycamore and Snake-barked Maple are propagated by budding on the common Sycamore or Swedish Maple.

Larch.—Rich soil, which has been manured a year previous to its being cropped with larch, often produces stronger seedlings than ground manured at the time of sowing, even although the former should have produced a previous crop. The seeds should be damped for twenty-four hours, and sown in the last week of April, or the first of May. One pound of good seeds is enough for three and a half yards of the bed. As it is difficult to know the quality of larch seeds by their appearance, the best way is to sow an ounce of it in a hot

bed, about the end of March, by which means the proportion of seed may be accurately regulated. Larch seeds should have about half an inch of covering, and should be weeded for the first time about the end of May; but if the roots are moved, the plants will immediately die. Beds of one year seedling larches should be thinned in the month of February, or in the beginning of March, by drawing out all the largest, where they appear thick, observing to leave a regular crop for two years' seedlings. Those drawn out should be transplanted into lines 10 inches apart, and the plants at a distance of from 2 to 3 inches. When these have stood in lines for one year, they must be put out; or by taking out one line, and leaving the next, and so on, those left may remain another year. Two years' seedlings are fit for being planted out into moor ground; but those that are one year old, and one year transplanted, generally thrive best in such ground. When two years' seedlings are transplanted into nursery lines, they should be placed at the distance of from 3 to 4 inches from each other, in lines one foot apart, and may remain one or two years. After being two years transplanted, they require pits when put out. When larches are kept three years in lines, without being moved, they get quite bare in the roots, and seldom succeed so well as those that are only two years transplanted.

Chestnut.—Sweet chestnuts are ripe about the end of October, and should be kept on a loft floor until about the middle of November. When quite dry and sound, the end of the year is the best time for sowing them, although any time before the middle of March will answer. A bushel of good seed is sufficient for a bed 25 yards long and 4 feet wide. The covering should be $1\frac{1}{2}$ inch in thickness. After being one year in the seed-bed, they should be transplanted into lines 18 inches apart, the plants 4 inches distant from each other. When they have been three years in lines, they should

be planted out. Those that are not fit for going out, should be pruned and transplanted.

Horse Chestnut.—This, which is one of the most beautiful trees that grow in our country, is treated in all respects like the sweet chestnut.

Birch.—The seeds of the common and weeping birches are ripe about the end of September. When they fall they are generally scattered, so that they cannot be gathered: they, therefore, require to be pulled off the tree. As they are very apt to heat, they should be spread thinly upon a floor, and kept till the end of March, when they should be damped and sown. They grow well in a damp sharp soil, that has a mixture of peat-earth. The ground should be smoothly dug and raked, after which the seeds should be trodden in, as they scarcely admit of any covering. One year seedlings are generally from four to seven inches high. The stoutest should be drawn and put into nursery lines, and the smaller left for a year longer. The lines for transplanted birches should be about a foot distant, the plants from 3 to 4 inches apart. Two years after, they are ready to be planted out.

Alder.—The seeds should be sown about the end of March, in a rich moist soil. The ground being dug and raked, the seeds should be sown and tramped into it, after which a slight covering, not exceeding half an inch in thickness, should be applied. One pound is sufficient for a bed 15 yards in length, and 4 feet in breadth. When the plants are one year old, the beds should be thinned, by drawing all the largest for transplanting. The lines should be 16 inches apart, the plants about 3 inches. Those remaining in the seed-beds should be transplanted, when two years old, into lines at the same distance, but the plants a little thinner in the lines.

Mountain Ash, or Rowan.—The berries, which are ripe in the end of September, should be put into a pit in dry ground, with a mixture of sand or sharp earth among them, where

they should remain for twelve months. A bushel, half seed, half earth, is sufficient for 18 yards of a bed 4 feet wide; the covering to be $1\frac{1}{2}$ inch thick. The plants will appear in the following spring, and if the ground is good, they will be fit for transplanting after being one year in the seed-bed. The lines should be 16 inches apart, the plants 4 inches. When they are transplanted, the long fibres of their roots should be pruned off. When two years transplanted, they are commonly from 2 to 3 feet high, and are thus fit for going out; but when required larger, they should be replanted and allowed more room. The varieties with entire instead of pinnate leaves, are propagated by budding on the common.

The *Service* ripens its seeds rather later than the mountain-ash, but the instructions respecting the latter are equally applicable to it.

Hornbeam.—The seeds should be sown in February or March. A bushel is sufficient for 50 yards of a bed 4 feet wide. The covering should be an inch thick. The seedlings should be transplanted when one year old, into lines 14 inches apart, the plants 3 inches distant. When two or three years transplanted, they are fit for going out. Hornbeam is well suited for hedges which are only required for shelter. It grows close, is less scourging to ground than most trees, and crops commonly thrive well in the vicinity of hedges made of it, which is not the case with hedges of many other trees.

Hawthorn.—Haws are ripe in the end of October, and when collected, should be pitted in dry sharp ground, one bushel of earth being added to every two bushels of the berries. In this state they should remain a year, without any other attention than turning them every two or three months. They may be sown any time between October and March in ground richly manured. One bushel of seeds, in the mixed state above mentioned, is enough for 10 yards of a bed 4 feet wide. The covering should be one inch deep. If thorn is to be sown in strong clay soil, it should not be done until

spring, for if sown in the end of the year, it would be in danger of binding too firm, before the plants could get through the surface. Well grown one year seedlings should be transplanted into rich ground, in lines 1 foot apart, the plants about 2 inches distant. In three years they are fit for being planted out in hedges. Two years' seedlings should also be planted out at the above distances, but when thorns are transplanted and intended for trees, they should be allowed a much greater space. Thorns never overgrow in nurseries, for when they get old and unhealthy in their appearance, they may be cut over by the surface of the ground at any time from October to March, after which they will come up quite fresh, and better suited for hedges than formerly; but in order to have them well rooted, they should not remain longer than three years in lines, without being replanted.

Laburnum.—The seeds are ripe in the beginning of October. When collected, the pods should be spread to dry, and then thrashed out and cleaned, as pease. They should be grown in ground well fenced from hares, as these animals are very apt to destroy them. They should be sown in the middle of March. One pound of seeds is sufficient for 20 yards of a bed 4 feet wide. The covering should be 1 inch thick. One year seedlings are generally transplanted into lines about 9 inches apart, the plants about 2 inches separate. When two years transplanted, they should be removed into lines 18 inches apart, the distance between the plants being 4 inches. When they have remained other two years, they are fit for going out.

Holly.—The berries may be collected any time from November to March. They are to be mixed up with light sharp earth, and pitted for a year. They may be sown any time between October and March into beds of deep free soil. One bushel, containing two-thirds of seeds and one-third of earth, is enough for sowing 14 yards of a bed 4 feet wide. The covering should be an inch thick. In two years they are gene-

rally fit for being transplanted, and they should be lifted with as much earth as will adhere to their roots. September, March, and April, are the best months for transplanting. The lines should be only 6 or 7 inches apart, each plant being from 1 to 2 inches separate. When six or seven lines are completed, a vacancy of 14 inches should be left for an alley, which is required in cleaning the plants. They should afterwards be transplanted every two or three years at farthest, space proportionate to their size being allowed them, until they are fit for going out.

Gean-Tree.—The seeds are treated like those of the holly, and may be sown from October to March, in rich but not very damp ground. Half a bushel of clean seed is enough for 25 yards of a bed 4 feet wide. The covering should be from 1 inch to $1\frac{1}{2}$ inch thick. It is commonly the case that only some of the seeds spring the first year after they are sown. These should be transplanted when one year old, as should the others the next season, into lines 15 inches apart, the plants about 4 inches distant. When two years transplanted, they are generally fit for going out.

Yew.—The berries are pitted for a year, and may be sown any time from October to March, in rich ground. A quarter of a bushel, half seed and half sand, will sow a bed 40 feet long and 4 broad. When the seedlings are two years old, they should be transplanted, with soil adhering to their roots, into lines about ten inches apart, the plants being 3 or 4 inches separate. They should not continue more than three years in lines, without being replanted. They thrive best, and are of the best colour, when they get little or no sunshine.

Elder.—The common varieties of this plant may be grown from seeds, but they answer better from cuttings. In the end of November, prune off a quantity of shoots of one year's growth: dress them one by one, making each 10 or 12 inches long, with a joint at the bottom, from which roots will spring,

and another near the top. The cuttings may be either dibbled or natched in lines, 3 or 4 inches being left above ground. The variety with scarlet berries is that which grows best, and is generally fit for going out when one year old.

Poplars.—All the species of poplar grow easily by cuttings, except the white poplar, which is grown by layers. In selecting cuttings, it should be kept in mind, that although two years old wood will grow, one year old shoots strike more freely, and make the best plants. The shoots should be about 8 inches long, and may be either dibbled or natched, about 2 inches of each being left above ground.

Willows.—All kinds of willows grow by cuttings, and should be treated in the same manner as poplars. The best time for planting is in March.

Trees grown from Stools by Layers: Lime, English Elm, White Egyptian or Downy Poplar, Oriental and Occidental Planes.—Plants of any of these trees intended for stools must be stout and well rooted. The ground should be very rich and free. Stools should be planted at the distance of 4 feet from each other, in lines 6 feet apart. They are to be planted in November, and about the middle of March, when the sap is coming, they should be cut down about 3 inches above the surface of the ground. Numerous shoots will then appear above the roots, but those of the first year after transplanting will not be so strong as those that come afterwards. In open weather, between the beginning of November and March, the ground should be dug smoothly around the stools, and cuts 4 or 5 inches deep made with the spade directly under the shoots. Bend down the branch intended to be laid, into the bottom of the cut, placing its free extremity or top in an erect position; then tramp the earth close upon it, taking care to leave the top above ground. These shoots will take root in the course of the summer, and are fit for being separated and planted in rows in autumn.

ESSAY III.—By Mr ALEXANDER GRIGOR, Nurseryman,
Elgin.

[Of this Essay, which agrees in general with the last, and is equally characterized by perspicuity, it has been thought sufficient to present the following particulars.]

Oak.—One bushel of seed to 24 square yards. Covering one inch and a half: after two years put into lines 18 inches apart, the plants 6 inches from each other.

Ash.—One pound to 48 square feet, covering 1 inch deep. When one year old, put into lines 18 inches apart, the plants 6 inches from each other.

Wych or Scotch Elm.—The surface covered by the seeds. Covering $\frac{3}{4}$ inch deep. Transplanted as oak.

Beech or Hornbeam.—One bushel of beech to 48 square yards, the same quantity of hornbeam to 50 or 52. Covering 1 inch. Transplanted as oak.

Sycamore.—A bushel to 26 or 30 square yards. Covering nearly 1 inch. When one year old planted into lines, as oak.

Larch.—One pound to 4 square yards. Covering only $\frac{1}{4}$ inch. Transplanted when one year old into lines 10 or 12 inches apart.

Sweet Chestnut.—Seeds about an inch apart, covering 2 inches. When one year old, transplanted into lines about 2 feet distant, the plants 10 inches apart.

Horse Chestnut.—As the last.

Birch.—Seeds to be trodden in, with scarcely any covering. When one or two years old, transplanted like ash.

Alder.—Sown like birch. When two yearsold, put into lines, 18 inches apart, the plants 6 inches from each other.

Mountain Ash.—Pitted, but to be sown in the ensuing spring.

Hawthorn.—One bushel to 30 square yards. Covering 1

inch. Transplanted when one or two years old into rows 12 inches apart, the plants 4 inches.

Elder.—Best propagated by cuttings, placed 5 or 6 inches apart, in lines 15 inches distant.

Laburnum.—One pound to 12 square yards. Covering 1 inch. When one year old, transplanted into lines 15 inches apart, the plant 5 or 6 inches.

Swedish Maple.—One bushel to 26 or 30 square yards. Covering 1 inch. Transplanted into lines 18 inches apart, the plant 6 inches distant.

Holly.—One bushel to 30 square yards. Covering 1 inch. Transplanted when two years old into lines 15 inches apart, the plant 6 inches distant.

Evergreen Oaks.—As the common Oak.

Scotch Fir, Pines, and Spruces in general.—One pound to 18 square yards.

Lime, Downy Poplar, English Elm.—Propagated by layers.

Poplars and Willows.—Propagated by cuttings.

ESSAY IV.—NOTE RESPECTING A CHEAP METHOD OF PLANTING MOOR-LAND OR HEATH. *Communicated by Mr JOHN GRIGOR, Nurseryman, Forres.*

PERHAPS in no operation in general practice is there a greater diversity of methods than in that of planting moor-ground. The system here recommended as peculiarly cheap and successful, is by planting with a small spade, called the Hand-iron, of which a figure is annexed. The persons using it should have a small bag for carrying plants tied round their waist, and each should keep at such a distance from the next as is required between the plants. The overseer should follow after, to see that none plant carelessly or slightly, in order to keep pace with those who are more expert. One person may

very easily superintend ten or twelve planters. The iron should be struck into the ground with one hand, in a slanting direction, which will make it penetrate easier than when it is kept perpendicular. The plant is inserted with the other hand, and is placed on the farther side of the iron; in other words, the iron should be between the person and the plant; and by turning the turf a little to one side by the iron, an opening is made for its roots. When the plant is put in, the ground forced up by the iron should receive a stamp with the heel, which will firm it. Moor or peat ground is naturally apt to shrink and contract in summer, and when plants are inserted by making a larger opening in the ground, the incision opens and exposes the roots at a time when they are most likely to suffer. The hand-iron makes an opening only a little larger than the heel of a person's shoe, so that when the plant is put in, a single stamp with the foot is sufficient to secure it.



In the spring of 1830 I planted 1,400,000 Scotch fir and larch plants on the estate of Ballindalloch. They were placed at the average distance of four feet. Each Scotch acre contained

500 one-year transplanted larches,	.	.	.	L. 0	1	9
1500 two-year seedling do.	.	.	.	0	3	0
500 one-year transplanted Scotch firs,	.	.	.	0	0	9
1000 two-year seedling do.	.	.	.	0	1	0
Carriage of plants to the moor,	.	.	.	0	1	2
Expense of planting 3500,	.	.	.	0	2	4
Total expense per Scotch acre,				L. 0	10	0

In the autumn of 1830, I planted 58 Scotch acres of moorland, by contract, on the estate of Aberlour. The plants

were larch and Scotch fir, and were placed at the distance of three feet. The expense was as follows :

2000 one-year old seedling larches,	.	.	.	L. 0	2	6
1000 two-year old do. do.	.	.	.	0	2	0
3000 two-year old do. Scotch firs,	.	.	.	0	3	0
Expense of planting 6000,	.	.	.	0	3	0
Total expense per acre,				L. 0	10	6

Neither of these plantations required replanting, nor in fact could a single failure be pointed out.

When persons are long accustomed to any system of planting, they can hardly be persuaded to give it up, although it should be much inferior to others. They may look around and see thriving plantations, that were executed according to their favourite methods, and they are apt to think that there can be no room for improvements ; but they never consider how often they have been obliged to replant the ground, and seldom calculate the small expense at which the work might be done, were they to avail themselves of recent and successful experiments.

ON THE PRINCIPAL VARIETIES OF THE POTATO CULTIVATED
IN THIS COUNTRY. *By Mr CHARLES LAWSON, Seeds-
man to the Society.*

THE results of the numerous experiments already on record, shewing the superiority of some kinds of potatoes over others, induced me to pay some attention to the subject, and to collect characteristic specimens of all the varieties which I could obtain, with the view of submitting them to comparative investigation.

The mere names applied to the varieties in cultivation afford little useful information, the same sorts being frequently called by different names in different districts ; and in present-

ing a tabular view of the principal varieties, I have been careful to note their distinctive qualities.

That new varieties may be produced by seed *ad infinitum* is well known; and that those already in existence are numerous, is in some measure demonstrated by the list which I have prepared. These varieties are in general distinguishable by their form and colour, the appearance of the eyes, or some peculiarity in their growth.

But if the permanency of varieties cannot be depended upon, the utility of any comparison of their merits would be greatly lessened. This permanency has frequently been disputed, and it has been argued, that as the tuberous roots of the potato are lateral productions, like the buds of trees, and productive of plants exactly resembling the parent, they must be liable to hereditary diseases, and so become ultimately unhealthy. By some, fourteen years are stated as the period of existence of a variety of potato; and in support of this opinion, the appearance of the curl about that period is adduced as an evidence of decay.

This doctrine, however, has always appeared to me opposed to analogy, as shewn in the cultivation of plants generally; and even although Mr Knight's doctrine as to the apple should be correct, it does not follow that production by extension, and production by means of tubers, are the same. The latter I consider as equally fitted to produce a progeny distinct from the parents as the generation by seeds.

The tubers, however, having no source of improvement after they have arrived at maturity, and being liable like all plants to injuries, may contract hereditary diseases, which, however, might have been prevented by proper attention. I believe that any variety of potato, cultivated by means of tubers, may be continued unchanged to any length of time, provided due care be employed in its culture.

No doubt extensive experience has proved, that the culti-

vation of any particular variety of potato, for a continued succession of crops, in the same soil and situation, injures the quality, and diminishes the quantity of the produce. But this is a law applicable to all cultivated plants, and only shews that attention to the change of circumstances and to rotation is also necessary in the cultivation of the potato.

Nothing appears to me to resemble the growth of the potato under ground, so much as the strawberry does above ground. In the former, a shoot springs from the root of the plant, after the leaves are expanded in the air to oxygenate the nutritious fluids, and so forms a tuber ; and in the latter, the runner performs the same office, and deposits a new plant. The most scrupulous as to the permanency of varieties will admit, that those of the potato are at least as enduring as those of the strawberry. Now, by attention to the numerous varieties of this plant, we have been enabled to avail ourselves of every benefit arising from an accurate discrimination of the sorts. In like manner, attention to the potato may enable us to obtain similar, nay even more important benefits.

What is wanted regarding the potato is,

1. The fixed application of a particular name to each of the more important varieties ;
2. The determination of those varieties the cultivation of which ought to be abandoned ;
3. The indication of those more peculiarly adapted to particular soils, situations, and purposes ;
4. The knowledge of those to which we might look with most certainty as improvable by crossing.

With these views I have prepared the following descriptive table of the varieties which I had an opportunity of growing and examining this season.

There can be no doubt that a change of soil, climate and treatment, may alter the qualities of the tubers in a considerable degree ; but it appears to me not less true, that no

circumstance will very materially change the general tendency to being early or late, the general form, the colour, or the general habit of growth.

I have therefore noted these particulars, as affording collectively discriminative characters of sufficient value.

The tubers are composed of water, starch, fibrous matter, mucilage, and saline extract. It is probable that the mealiness depends either upon a due proportion of these principles, or upon the mucilage of some being more or less coagulable by heat than that of others; or it may occasionally be affected by the acidity of the spring-water in which they are boiled. However this may be, I have noted the quality of the different varieties as to their being mealy or waxy.

The comparative liability to disease is the next circumstance attended to. The mode of growth of the stems, whether inclined to be erect or drooping, has also been noted.

The flavour, I apprehend, depends very materially on the increased action of the vital functions of the leaves, and does not admit of being very intelligibly expressed.

The degree of productiveness is a matter of great importance, but can be expressed only by very general and rather vague terms.

Although the same variety of potato, cultivated under different circumstances, may yield different proportions of its component parts, yet as a comparative view of that ingredient of most importance in its application as food, namely the starch, from the different varieties cultivated under the same circumstances, will afford a good criterion as to their relative value, I have ascertained this by rasping eight ounces of tuber of each variety, which being immediately mixed with a sufficient quantity of water, was poured upon a fine hair-sieve, through which the water passed, carrying with it the white precipitate. The weight of this sediment deposited from the filtrated fluid, after being thoroughly dried, is marked in the table. In those cases where the difference was great, to prevent the pos-

sibility of mistake, I made second trials. I think it likely that had the macerated potato lain for a day, and been frequently stirred, the quantity of starch would have been greater; but as the whole were done exactly in the same way, the products answer equally well, as affording a comparative view.

In the specimens of starch produced by the different varieties, a considerable difference was perceptible, both as to colour and texture; and on trying the specific gravity of twenty specimens, I found it to vary from 1 to 8 per cent.

The fibre of 8 oz. of tuber in twenty varieties, when dried, weighed from 180 to 216 grains troy.

The specific gravity of the tubers themselves is nearly in the same ratio as that of the starch, as above indicated. A cubic inch of twenty of the varieties which I tried weighed from 295 to 312 grains. The comparison, however, requires to be made with greater accuracy than I can accomplish at present, in order to discover whether Mr Knight's opinion, that "probably the nutritive property of the potato is nearly proportionate to its specific gravity," be correct. In the mean time, however, my friend Mr Macgillivray has obtained for me, from Dr John Murray, the specific gravity of six of the varieties sufficiently adapted for contrast, namely,

No. 45. Late Field Kidney,	. . . . .	1135
No. 36. Don,	. . . . .	1121.9
No. 53. Emperor,	. . . . .	1108
No. 24. Taylor's,	. . . . .	1099
No. 49. Ox Noble,	. . . . .	1094
No. 50. Yam,	. . . . .	1051

From these it will be seen, by a reference to the Table of the quantity of starch yielded by these varieties, that the starch increases in nearly the same ratio as the specific gravity, and thus that the correctness of Mr Knight's opinion is proved.

LIST of SPECIMENS of POTATOES, with their Characters, sent to the HIGHLAND SOCIETY, by Mr LAWSON.

No.	Popular Name.	Early or Late.	Form of the Tuber.	Colour of the Tuber.	Waxy or Mealy.	Liable to Disease or free from that tendency.	Inclination of the Stems.	Flavour.	Productiveness.	Grains Troy of Starch in 8 oz. Clean Tubers.
1	Seedling, Early	Very early	Round	White	Mealy	Not subject	Upright	Superior	{ Medium prolific }	410
2	Kay's American	Very early	Oblong	Reddish	Mealy	Not subject	Upright	Good	Prolific	390
3	Hopeton Early	Early	Round	White	Mealy	Not subject	Upright	Good	Prolific	395
4	Dutch Early	Early	{ Round & small }	{ White }	Mealy	Not subject	Upright	Good	Prolific	325
5	Williamson's Favourite	Early	Round	White	Mealy	Not subject	Medium	Good	Prolific	453
6	Early Champion	Medium	Round	White	Mealy	Not subject	Upright	Strong	Prolific	306
7	Early Frame	Very early	Roundish	White	Mealy	Not subject	Upright	Good	Medium	262
8	Dwarf Frame	Earliest	Round	White	Waxy	Liable	Upright	Inferior	Medium	279
9	Manly	Medium	{ Round & flat }	{ White }	Mealy	Not subject	Upright	Good	Prolific	300
10	Foxly	Very early	Ditto	White	Waxy	Subject	Drooping	Inferior	Unproductive	262
11	Early Shaw	Early	Round	White	Rather waxy	Not subject	Upright	Good	Very prolific	375
12	Ash-leaved	Early	Oblong	White	Waxy	Not subject	Upright	Inferior	Very prolific	363
13	American	Early	Round	White	Mealy	Not subject	Upright	Good	Prolific	385
14	Rose's Early	Early	Round	White	Mealy	Not subject	Upright	Good	Prolific	364
15	Early Wellington	Early	Round	White	Mealy	Not subject	Upright	Good	Prolific	328
16	Early Field-kidney	Early	{ Long & flat }	{ White & pink }	Mealy	Not subject	Drooping	Superior	Prolific	295
17	Sutherland Kidney	Medium	{ Oblong & flat }	{ White }	Mealy	Not subject	Drooping	Good	Prolific	355
18	Asparagus	Early	Oblong	Dingy white	Waxy	Liable	Drooping	Indifferent	{ Very Un-productive }	
19	Cape of Good Hope Kidney	Early	Kidney	White	Mealy	Not subject	Drooping	Superior	Prolific	395
20	Musgrove's Giant Kidney	Early	Oblong	White	Mealy	Not subject	Medium	Good	Very prolific	390
21	Musgrove's Snow White	Early	Oblong	White	Medium	Not subject	Upright	Good	Very prolific	395
22	Fifeshire Early	Early	Oblong	White	Mealy	Not subject	Upright	Good	Prolific	465
23	Ross's Pigmy Kidney	Medium	Kidney	White	Mealy	Not subject	Upright	Fine rich	Prolific	305
24	Taylor's Forty-fold	Medium	Round	Dull red	Mealy	Not subject	Upright	Superior	Prolific	235

LIST of SPECIMENS of POTATOES,—continued.

No.	Popular Name.	Early or Late.	Form of the Tuber.	Colour of the Tuber.	Waxy or Mealy.	Liable to Disease, or free from that tendency.	Inclination of the Stems.	Flavour.	Productiveness.	Grains Troy of Starch in 8 oz. Clean Tubers.
25	Black Skinned	Late	Round	Dark purple	Mealy	Not subject	Drooping	Delicate	Prolific	383
26	Purple-skinned	Late	Oblong	Purple	Mealy	Not subject	Upright	Superior	Prolific	268
27	Bread Fruit	Late	Round	White	Mealy	Not subject	Upright	Superior	Prolific	395
28	Red Nose Kidney	Late	Long flat	White & pink	Mealy	Not subject	Medium	Good	Medium	294
29	Pine Apple Kidney	Late	Long	White	Waxy	Not subject	Drooping	Inferior	Prolific	245
30	Variety of ditto	Late	Oblong	White	Waxy	Not subject	Drooping	Inferior	Prolific	340
31	Lancashire Pink	Very Late	Round	Bright pink	Waxy	Not subject	Upright	Medium	Prolific	441
32	Red Apple	Medium	Round	Red	Very mealy	Not subject	Upright	Superior	Prolific	302
33	{ Late Wellington, or } { Staffold Hall }	Late	Oblong	Dark red	Mealy	Not subject	Trailing	Superior	Prolific	542
34	Scotch Black	Late	Round	Black	Mealy	Not subject	Upright	Superior	Prolific	372
35	American Black	Late	Round	Dark purple	Waxy	Not subject	Upright	Inferior	Prolific	364
36	Don	Late	Round	White & purple	Mealy	Not subject	Upright	Superior	Very prolific	399
37	Captain Fraser's Seedling	Late	Obl. flat	White & pink	Mealy	Not subject	Upright	Superior	Prolific	316
38	Scotch Red	Late	{ Round } { & flat }	Deep red	Mealy	Not subject	Upright	Superior	Prolific	488
39	Perthshire Red	Late	Oblong	Red	Waxy	Not subject	Upright	Good	Prolific	518
40	Scotch Grey	Late	Round	Livid purple	Medium	Tendency	Upright	Good	Unproductive	247
41	Variety of Scotch Grey	Late	Round	Dark purple	Mealy	Not subject	Upright	Superior	Prolific	356
42	Black Kidney	Late	Oblong	Black	Mealy	Not subject	Upright	Superior	Not prolific	289
43	Albany Kidney	Late	{ Oblong } { & flat }	White	Mealy	Not subject	Drooping	Superior	Prolific	232
44	London Kidney	Early	Kidney	White	Mealy	Not subject	Drooping	Superior	Very prolific	416
45	Late Field-kidney	Late	{ Oblong } { & flat }	White & pink	Mealy	Not subject	Drooping	Superior	Very prolific	389
46	Poor Man's Profit	Late	{ Round } { oblong }	Red	Mealy	Not subject	Upright	Superior	Not prolific	377
47	Lady Mary	Late	Round	Purple	Mealy	Not subject	Upright	Superior	Prolific	197
48	Late Champion	Late	Round	White	Medium	Not subject	Upright	Good	Prolific	197
49	Ox Noble	Late	Round	White	Watery & waxy	Not subject	Upright	Indifferent	Very prolific	295

LIST of SPECIMENS of POTATOES—continued.

No.	Popular Name.	Early or Late	Form of the Tuber.	Colour of the Tuber.	Waxy or Mealy.	Liable to Disease, or free from that tendency.	Inclination of the Stems.	Flavour.	Productiveness.	Grains Troy of Starch in 8 oz Clean Tubers.
50	Yam	Late	Oblong	Pink	Watery & waxy	Not subject	Trailing	Indifferent	Very prolific	262
51	Cork Red	Medium	Round	Red	Very mealy	Not subject	Upright	Superior	Prolific	556
52	Buff	Late	Round	Buff	Mealy	Not subject	Upright	Superior	Prolific	307
53	{ Emperor, or Apple of the Earth }	Late	Round	Purple	Mealy	Not subject	Upright	Medium	Prolific	305
54	Onion Potato	Late	Roundish	Purplish	Very mealy			Good	Prolific	304
55	Black Prince	Late	Round	Black	Medium mealy			Indifferent	Prolific	345
56	Peruvian Potato	Late	Oblong	White	Medium mealy			Indifferent	Prolific	436
57	Biscuit Potato	Late	Round	{ Pink, with red eyes }	Very mealy			Superior	Prolific	316
58	Wild Potato	Late	Round	Pinkish	Waxy			Inferior	Prolific	328
59	Yellow Potato	Late	Oblong	Whitish Yellow	Medium mealy			Good	Prolific	390
60	Yellow Cone	Late	Long	Ditto	Mealy			Fine	Prolific	398
61	Prize of Westerfield	Late	Round	Red	Mealy			Superior	Very prolific	295
62	Cucumber Potato	Late	Oblong	White	Medium mealy			Indifferent	Prolific	363
63	Chestnut Potato	Late	Oblong	{ Purple, with red eyes }	Very mealy			Superior	Prolific	397
64	Wakefield Potato	Late	Oblong	Red	Rather waxy			Medium	Prolific	325
65	Early Pale Red	Med. early	Oblong	Bright red	Very mealy			Superior	Productive	356
66	Marbled	Late	Round	{ Marbled pink and red }	Very mealy			Superior	Productive	423
67	Long Red Kidney	Late	Long	Red	Medium mealy			Good	Medium	296
68	Early Red	Early	Oblong	Red	Very mealy			Superior	Productive	305
69	Forfar Kidney	Late	Long	White	Waxy			Indifferent	Medium	420
70	Black	Late	Round	{ Livid purple, the same inside }	{ Waxy }			Inferior	Productive	286
71	Cup	Late	Round	Light red	Mealy			Good	Productive	441
72	White	Late	Long	White	Mealy			Good	Productive	342
73	Robertson's Giant Red Kidn.	Late	Long	Bright red	Waxy			Medium	Medium	305

The potatoes in the list from No. 1 to No. 53 inclusive, were all grown on land of the same quality, viz. a rich loam of medium texture, and with decomposed stable manure.

The sorts from No. 54 to No. 73 inclusive, were grown on rich sandy loam.

In conclusion, I have only to express a hope that the investigation of the qualities and capabilities of this valuable plant will be followed out, so as to lead to important practical results.

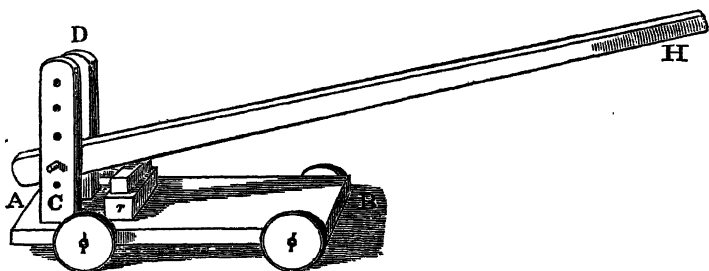
AN ESSAY ON THE EFFECTS OF COMPRESSION IN CONVERTING PEAT INTO FUEL. *By Mr WALTER TOD, Longhope, near Hawick.*

[The following essay on the subject of converting peat into fuel by compression, was received in consequence of the offer of a premium for the best account of a simple and economical method of effecting that purpose, and was honoured by the Society's approbation. It is followed by some remarks on the same subject by Mr Slight, the Curator of the Society's Collection of Models.]

IN constructing a machine for compressing peat, it seemed necessary that it should possess at least three distinct qualities,—that it might be easily moved about, to prevent the peats having to be carried any distance,—that it should have considerable power,—and that it should produce its full effect with the least loss of time possible.

To effect these objects, a machine was constructed, consisting of two strong planks of wood fixed together at each end by cross bars, and mounted upon four wheels.

Two pieces of wood, CD, at the distance of 2 inches from one another, are mortised in the plank AB, at the end A, and at right angles to AB. Between the upright posts CD,



there is inserted a strong beam AH, 12 feet long, and secured with an iron bolt passing through the pieces CD, which have numerous holes to admit of raising and depressing the beam AH at pleasure.

Two boxes were then made, one of wood, and one of sheet iron : the wood-box being about 12 inches long, 4 inches in breadth, and 4 inches deep ; the one of sheet-iron 14 inches in length, $3\frac{1}{2}$ broad, and $3\frac{1}{2}$ deep. The boxes had lids which just fitted them, about 3 inches in thickness, to allow them to sink in the boxes by the pressure.

Each box was alternately filled with peat newly dug, the lid adjusted, and the box placed in the machine at the point *r* ; a man stood at the end H of the beam AH, and as each box was placed in the machine at the point *r*, he bent his whole strength and weight upon the end of the beam. By this means, an immense pressure was applied to the box by a single effort, and in an instant of time. Two women filled and removed the boxes.

In this way, a man and three women could compress about eight cart-loads in a day. One man digging, and a woman throwing out the peats, could keep this process in full operation.

The peats when taken from the machine were built like small stacks of bricks, but so open as to admit a free circulation of air. The stacks put up in this way became perfectly dry, without being moved till they were led home.

If the machine just described were to be adopted for compressing peat, boxes of cast-iron, full of small holes, would answer the purpose best. For the pressure was so great, that the wood box frequently gave way, though strongly made, and secured with iron at the ends; even the one of strong sheet-iron bent under the pressure.

But should compression become general in converting peat into fuel, there can be no doubt that a machine still more effective could easily be devised, such as by rack-screws, and a thousand other mechanical contrivances. But the one employed in the experiments under consideration, had the advantages of being simple, cheap, convenient, expeditious, and possessing very considerable power.

So early as the end of March, a quantity of moss was brought home for the purpose of trying the effects of compression, and as a considerable number of the peats were broken by the carriage, they were put into an iron trough, and wrought into a consistency like paste. In this state they were compressed as already described. Those that were unbroken were compressed as they were. Labels were then attached to each to distinguish them. The former had the words "compos. peat compression," and the latter "simple peat compression."

They were dried by being placed upon wood, and exposed to the open air when the weather was dry, and were brought in during the night, so long as there was any chance of their being injured by frost. A few were left out, to see what effect the weather would have upon them, and though they were exposed to heavy rains, frost and snow, they were not in the least injured, and became fully as soon dry as those that had been more carefully managed.

When the compos. peats were sufficiently dry for experiment, 137 ounces were put on for a fire. The temperature of the room where the peats were put on, was 60°. A thermo-

meter was suspended in the centre of the room, and the temperature accurately marked every fifteen minutes till the temperature began to decline, which was exactly two hours.

Three days after, 137 ounces of good Vogrie coals were put on for a fire; the temperature of the room where the coals were put was 62°. Great care was taken that all the circumstances should be as much the same as possible. The thermometer was suspended in the centre of the room, exactly in the same position as before, and the temperature carefully marked every fifteen minutes till it began to decline, which was fully two hours. The duration of each of the fires was thus very nearly the same, and the following Table (I.) shews the results.

TABLE I.

Compos. Peats 137 ounces.		Vogrie Coals 137 ounces.	
Temperature of the Room,	60°	Temperature of the Room,	62°
First 15 minutes, . . .	62	First 15 minutes, . . .	63
Second ditto,	64	Second ditto,	64
Third do.	66	Third do.	65
Fourth do.	68	Fourth do.	65
Fifth do.	70	Fifth do.	66
Sixth do.	71	Sixth do.	67
Seventh do.	72	Seventh do.	68
Eighth do.	72	Eighth do.	68

The above table shews that the peats raised the thermometer 6° higher than the coals. The second experiment was with peats that were merely compressed at the moss as they were dug, and put up in a stack to dry, without ever being moved till they were led home, from the same stack as the specimens sent to the Society. And it deserves to be remarked, that the moss is far from being of the best quality.

Of these peats, 137 ounces were put on for a fire as before. the temperature of the room when the peats were put on was 59°. The following table shews the result, the thermometer being accurately marked every fifteen minutes as before.

TABLE II.

Simple Peat Compressed.		Vogrie Coals 137 ounces.	
Temperature of the Room,	59°	Temperature of the Room,	62°
First 15 minutes,	61	First 15 minutes,	63
Second ditto,	63	Second ditto,	64
Third do.	65	Third do.	65
Fourth do.	67	Fourth do.	65
Fifth do.	69	Fifth do.	66
Sixth do.	70	Sixth do.	67
Seventh do.	71	Seventh do.	68
Eighth do.	70	Eighth do.	68

This second table shews very nearly the same results as the first, the variation producing no effect upon the general results. The facts shewn by the tables, that the compos. peats and the simple peats compressed gave nearly the same degree of heat, is not exactly what I expected, as the compos. peats gave a much more beautiful light, and appeared much blacker in the colour. Even light-brown moss became black when made into compos. peats, in the manner already described, which shews that some chemical action takes place by the minute particles of the moss being exposed to the air. One thing is certain, that the light was much more clear and beautiful than that of the peats merely compressed; but I had no photometer to measure its intensity.

I made a few compressed peats with decoctions of wood, heather, tar, &c. Those made with a decoction of heather, gave a very brilliant and beautiful light; those from tar emitted a dark blue flame, and a peculiar smell, but which was by no means offensive. I was led to try this experiment from some hope that peat, combined with a small portion of tar, might be employed as occasional fuel by persons labouring under pectoral complaints, particularly in certain stages of phthisis pulmonalis, in which the vapour of tar and other resinous substances have, it is said, been employed with advantage, by various medical practitioners.

But the important points to be ascertained in this Essay, are the effects of compression in converting peat into fuel,—and the expense at which this process can be effected.

The first has in some measure been ascertained by the experiments just detailed, and the expense admits of accurate calculation.

It has been already stated, that two men and four women could compress about eight cart-loads in a day. The wages for men this year at that season was 20d., and for women 10d. per day. But in order to make every reasonable allowance, let each man have 2s., and each woman 1s. per day, which would make each cart load of compressed peats cost one shilling. Now in this part of the country, where peats are let by the cart-load, to be dug and dried in the usual manner, the general price is from 1s. to 1s. 3d. per cart-load. But a great part of this expense is incurred in drying the peats after they are dug ; for, by the common method, the peats are first spread upon the ground, and then put upon their ends in what are called Fittings,—then put up in stacks of various dimensions, till they become perfectly dry, and fit for being led home ; and were it not for that additional labour, the peats could be dug and spread upon the ground in the usual manner, at one-half of the expense incurred in compressing them.

But then, it must be remarked, that compressed peats can be rendered perfectly dry, with equal saving of this additional labour, so that upon a fair estimate of the expense of the two methods of converting peat into fuel,—that of compression would not much exceed that in common use ; so that compression, in converting peat into fuel, will be productive of great advantages to those districts of the country that are dependent upon that substance for fuel.

Could peat by compression be produced fit for the various purposes of domestic life, in any reasonable degree equal to coal, the advantage would be immense. In various districts

of this country, good coal may be said to average from 1s. to 1s. 3d. per cwt. Last winter I paid 1s. 6d. per cwt. for Vogrie coal. But let the average be reckoned at 1s. per cwt., and let eight cart-loads of compressed peat be equal to four cart-loads of coal containing 12 cwt. each, and the difference of price in this given quantity will be L. 2 Sterling.

And were the moss of the very best quality, even higher results might be obtained, as the moss upon which the experiments just detailed were performed is foggy, and hence far from being the best for converting into fuel. But I have sent specimens, that on this, and the general effects of compression, the Society may be enabled to judge for themselves.

11th October 1831.

NOTE by Mr SLIGHT, Curator of the Society's Museum of Models.

THE subject of the above Essay, viewed in connection with certain districts of Scotland, becomes important in an eminent degree. By converting the peat of the extensive and unprofitable mosses so profusely scattered over those districts into a transportable article of fuel, it may be conveyed to places where fuel of all kinds is scarce, and where coal, the only transportable article of the kind at present, is at a high price. It is also of importance to consider, that in most of the peat districts, those formations of rock only occur with which coal is seldom if ever associated. This may point out to us that it is worse than idle to delay the improvement of that fuel which nature has provided on the surface of the earth, in the delusive hope that coal may yet be discovered under it. It has been shewn above, that peat-moss, subjected to a moderate degree of pressure, becomes a fuel which, taken weight for weight, is capable of affording light and heat

equal to the best common Scotch coal ; and it also appears that the duration is nearly equal. The experiments do not seem to have extended to a comparison with peats dried in the usual way ; but there can be no doubt that the superior density of compressed peat, especially when submitted to the composition process, will render it more available than the common peat to all useful purposes. As the expense of preparing by this process appears not to exceed that by the ordinary method, we have a quantity of light and heat, two most essential elements in the comfort of northern climates, at a price not exceeding one-fifth part of that obtained from coal, taking both commodities at first cost ; while at the same time an incalculable advantage arises to the home consumer by the saving of time in drying his peats. All persons acquainted with the economy of the peat districts of Scotland are aware of the inconvenience to which the poorer classes are subjected, by the occurrence of a wet summer, as it prevents the successful preparation of their winter fuel. Peats after being cut, must lie on the moor from one to two months in the ordinary manner of drying, and in wet seasons even beyond that period, before they are fit for stacking. Even after all this, it sometimes happens that they are carried home in such a state of dampness, as to form a continual source of disappointment throughout the succeeding winter. To obviate this serious evil attendant upon cold and moist climates, let the new process be introduced, and the cottager not only gets free of the risk attending the preparation of his fuel, but he has the advantage of a superior article in his domestic comfort. It is presumed that by adopting a compressing machine, a period from eight to twelve days may be sufficient to produce the degree of dryness required. The introduction of a simple and efficient machine would therefore appear to be of great benefit to the inhabitants of the peat districts, and should the plan be objected to as expensive beyond the means of the poorer class, it may be answered that there is no necessity for each family or householder possessing one. Let the proprietor or tacksman

furnish one or more for the use of his tenants or cottars, who might again pay a small equivalent for the use of the machine. As the cottars of one farm or one hamlet usually dig their peats in the same field, a sufficient number could join together to work it to advantage. For such situations the machine must be of the simplest construction, so as to be cheap, and little liable to derangement. The form which Mr Tod has employed in his experiments seems to fulfil these conditions. Its simplicity is such that the rudest mechanic may make it and keep it in repair. The first cost must be trifling, being little more than the prime cost of two or three rough planks. Perhaps, under present circumstances, nothing better could be devised for the purpose of local supply.

But the subject may be viewed on a more extended scale. Let us look around at the extensive fields of peat-moss lying in various portions of our island, and bear in mind that these vegetable deposits are materials in the vast laboratory of nature, in an incipient stage towards a formation similar to that of our present coal-fields. Although we are unable to imitate a process, in which ages are required, there is yet one circumstance in it, which is within our power: we can employ pressure. And though, from the limited term of action in all human energies and human agencies, we may not produce perfect coal, yet a substitute may be obtained approaching still nearer to it than the common peat.

Since it is ascertained that a certain degree of pressure improves the quality of peat fuel, it is easy to see how machinery may be constructed, not only to increase that pressure and approximate it still nearer to coal, but to extend the production of it, so as to become an object of manufacture and an article of commerce. In many situations it might be shipped and conveyed coastways at a moderate expense, while in other districts of the interior, a land carriage of a few miles may bring it to market in populous towns; and, in either case, from the small expense of production, it might to some extent come into com-

petition with coal. This must be the more apparent, if we consider the heavy expense attending the working of coal-mines, in shafts, rail-roads and steam-engines, besides cutting it from the bed and raising it to the surface of the earth.

The supplying of fuel to distant parts is not the only advantage that may be anticipated from this manufacture, for its abundant production in many situations might lead to the establishment of other manufacturing operations which depend in some degree on the expense of fuel, as in all cases where the steam-engine can be employed, in the burning of lime also for agricultural and other purposes, and in many other departments that a cheap and ready supply of the article might suggest to men of enterprise and skill. With regard to expense, there is every reason to expect that peat-fuel may be produced in the dry state for about 1s. to 1s. 6d. per ton, and including a carriage upon it, suppose for ten miles, which may amount to 5s. 6d., or equal in the gross to 7s. per ton ; the price of course must vary with the distance, but as a ton of compressed peat may be considered equal to a ton of coal for household use, the advantage in favour of peat will amount to about 30 to 35 per cent.

Having of late paid some attention to this subject, with a view to devise a machine for manufacturing peats on the large scale, I have made a variety of experiments to determine the quantity of pressure required to discharge the moisture. These were performed chiefly by means of simple but powerful levers. The hydraulic press and an adaptation of the common printing press were also tried. Boxes of cast-iron perforated with small holes to allow the water to drain off were used, to contain the mass. When it was very full of moisture it became necessary to envelope the mass in a wrapper of coarse linen, which effectually retained the moss and allowed the water to escape; but the same result was obtained by having the moss previously deprived of part of its water by draining, or by the application of heat. The result of the experiments

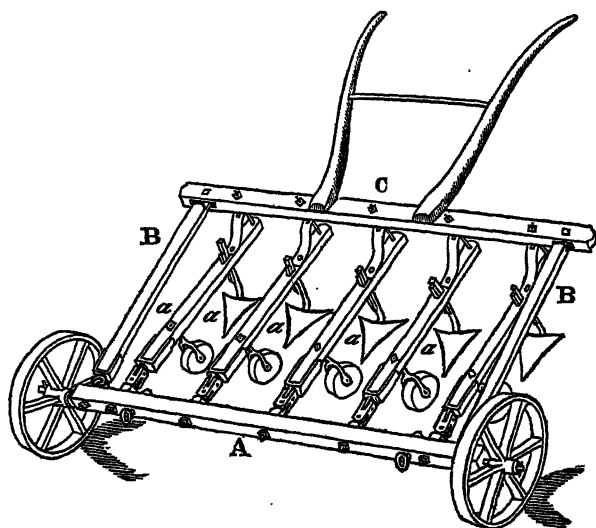
was, that in a box 10 inches long, 5 inches wide, and $4\frac{1}{2}$ inches deep, filled with wet moss, and subjected to a direct pressure of two tons, the peat was reduced in permanent bulk one-third, though while under the load it was as low as one-half, but returned to the permanent bulk on the removal of the pressure. The investigation of the subject has suggested a variety of forms in which machines for the purpose may be made; but for the present, one on a limited scale has been constructed in the shape of a working model, which, if approved of by the Society, may form the subject of another communication.

DESCRIPTION OF A NEW HOEING-MACHINE FOR CLEANING
DRILLED CORN-CROPS. *By Mr JAMES WILSON, Trap-
rain, East Lothian.*

THIS hoeing-machine is intended for cleaning the ground between the rows of white corn crops. The implement is represented in the annexed cut, and consists of an outer frame of timber, measuring over all about $4\frac{1}{2}$ feet in width by $3\frac{1}{2}$ feet in length, supported in the fore part on two wheels of about 20 inches in height, whose axles are bolted to the lower side of the front bar A, and to this bar also the draught is applied. The two side bars B B are attached to the front by a hook-and-eye joint, allowing a considerable freedom of motion in every direction; they are also attached to the hind bar C, by a mortice-joint and loose tenon, admitting of motion in a horizontal direction only. The outward frame is therefore a variable parallelogram. The five coulter-bars *a* are attached to the front bar by a species of double hinge, having one joint moving vertically, and the other in a horizontal direction, giving a certain degree of universal motion along with the side bars. The hind end of the coulter-bars are connected to the back bar of the frame by means of a bolt, which is fixed in the coulter-bar, but is made to slide easily in the correspond-

ing holes in the hind bar, the coulter-bars being thereby allowed to rise and fall in the hind end. A slight spring is attached to each of the coulter-bars, and is adjusted to act against the lower side of the hind bar, thereby keeping the coulters at their greatest depression. The coulters are fitted to a mortice at about two-thirds of the length from the fore end of the bars, and are fixed by wedges at the required height. In front of each coulter, a wheel of about 6 inches diameter is attached to each bar, serving to regulate the depth to which the coulters are to work. To the hind bar are also attached a pair of stilts, or handles, adapted to the height of the man who directs the implement.

From the form and description of the machine, it is easy to see that it must be made to dress, either the same, or half, or any other aliquot part; of the original number of rows performed with the sowing-machine, by which the crop has been sown; and the intervals must be the same in both. The utility of the universal motion in the coulter-bars and frame will also be apparent; the horizontal motion of the whole,



allowing the director to follow any sinuosity that may have occurred in the operation of sowing, where all the rows sown at one turn must be parallel, though they may not be in perfectly straight lines. The vertical motion of the coulter-bars at the same time allows any individual bar to rise when its coulter happens to meet with any obstacle, and so to pass over it without affecting the position of the others.

Mr Wilson's experiments have been conducted with a five-barred machine, which is drawn by one horse, guided by a boy, while the machine is held by a man; and from his calculation it appears, they could dress five acres per day at an expense of 1s. 1d. to 1s. 5d. per acre. This is held to be considerably under the expense of hand-hoeing, but he is of opinion that its greatest advantages will be found in situations where a sufficient number of hands cannot be procured to meet the exigencies of the season, when circumstances render expedition indispensable in the cultivation of drilled culmiferous crops.

Although the implement is shewn with goose-feet coulters, any other form may be substituted for this, as plain teeth, to act as a harrow for pulverizing or for covering in grass-seeds, or they may be so formed as to earth-up the crop, if required.

The efficient manner in which Mr Wilson's new implement operates, has been certified by two intelligent practical farmers, who witnessed and made trial of its powers. We would, however, suggest, that the number of moveable joints in the implement might be reduced without lessening its efficiency; and that the addition of a pair of shafts for the horse, might render the action of the machine more steady, and its direction more certain.

CATALOGUE OF MODELS AND MACHINES IN THE MUSEUM OF
THE HIGHLAND SOCIETY.

THE Directors having ordered a Catalogue of the Models and Machines in the Society's Museum to be prepared, resolved that it would be expedient to have it published in the Transactions. The Catalogue has accordingly been prepared by Mr Slight, the Curator of the Museum, with such short notices of the principal Models as appeared to be necessary, a fuller and more extended List having been placed in the Museum for the information of members and strangers.

The Models are arranged in six divisions, the first consisting of a series of the implements in common use upon the farms of the best cultivated districts; and the others such Models and Machines as have been from time to time presented to the Society, and for which premiums have been generally awarded.

The Models in the first division have been executed by Messrs Slight and Lillie of Edinburgh, under the direction of Mr Slight, the Curator. They have been made to a fixed scale, and after the best examples that could be obtained in Scotland; the names of the makers of the particular machines and implements that have been selected as patterns being always attached to the different models.

DIVISION I.

This division consists of a series of Models of Agricultural Implements and Machines of the most approved construction, as now used in the best cultivated districts of Scotland. Those only have been selected which are considered as of universal application under the present system of farming. All

the machines, and most of the implements in this division, are made to one scale, three inches to a foot; and in these the parts which in the large machine are made of wood, are the same in the model; the parts that are of wrought-iron are likewise of wrought-iron; and the parts that are of cast-iron in the large machines are either of that material or of brass.

1. Iron Plough. The plough of which this is a model is the two-horse swing plough, with the most important improvements which have been made upon it.
2. Pair of Harrows. These are of the rhomboidal form, and made of wood.
3. Grubber. This is the grubber of Kirkwood. It is made of wrought-iron, and is a very effective machine. The handles are made to act as levers, by which the coulters can be raised at any time from the ground.
4. Revolving Harrow. This is the revolving harrow of Morton. It is a species of grubber, wherein a number of small naves, armed with radiating prongs, are made to revolve in planes that are oblique to the line of direction in which the machine travels. These prongs stir the ground, and at the same time tear up root-weeds, which are brought to the surface and collected by the rake appended to the machine.
5. Finlayson's Harrow. This is also of the class of grubbers. It is furnished with nine coulters when made of a weight of draught for four horses, and with seven coulters when it is to be drawn by two horses. The coulters, by means of a lever, possess a limited power of being lifted from the ground.
6. Roller. This roller is formed with a cast-iron cylinder, divided into two parts, to facilitate the action of turning.
7. Drill Sowing-Machine. This machine is for sowing white crops, and sews eight, nine, ten, or eleven rows, as may be required. Motion is communicated by one of the carriage-wheels to a spindle placed in the seed-chest; and the grain is expelled by means of pinions upon the spindle, and conveyed through tubes to ruts made in the ground by the coulters.
8. Broad-cast Sowing-Machine. The broad-cast machine acts on the same general principles as the former, with a little difference in the arrangement of the parts. The seed, when discharged from the chest, instead of being conveyed to the ground through tubes, falls from the orifices upon a projecting board, that has the effect of scattering it with regularity on the ground.

9. Drill Sowing-Machine for Peas and Beans. This machine is calculated for sowing one row at a time in the hollow of the furrow formed by the plough.
10. Drill Sowing-Machine for Turnips. This machine is formed with revolving cylinders placed upon an axis, to which motion is communicated from the carriage-wheel. An apparatus is fitted to the machine in the case of sowing bone-dust along with the seeds.
11. Hoeing Plough. For tilling the intervals of beans, potatoes, and turnips. This plough is formed with two lateral bars jointed to the beam, and with one bent coulter to each bar.
12. Double Mould-board Plough. This is formed out of the last mentioned instrument, by removing the coulters, and attaching the two mould-boards.
13. Thrashing Machine. This machine is formed after the most approved models, and may be driven by wind, water, steam, or horse-power.
14. Winnowing Machine. This is taken from one of highly improved construction, by Messrs Scouler, Haddington. It is provided with two riddles and two sieves. The grain is separated into three qualities, discharged at their respective nozzles, and a fourth compartment is allotted for the collection of small seeds that may have grown up with the grain.
15. Turnip-Slicer. This machine is intended for preparing turnips as food for sheep, by cutting them into small oblong pieces by a reciprocating cutter.
16. Circular Turnip-Slicer. This machine performs the same office as the last, but is calculated to do more work with a given power, the cutters being fixed upon the face of a disc of cast-iron, which is kept in revolution by the impelling power.
17. Straw and Hay Cutter. In this machine the straw is brought forward on an endless web with an intermitting motion. The cutting-knife is fixed upon a fly-wheel, and the straw, when it arrives at the cutting-block, is held fast by a stamper which falls upon it immediately before the stroke of the knife, and which rises again as soon as the stroke is given.
18. Single Horse Cart. The common one-horse tilt-cart with shifting top sides.
19. Corn or Hay Frame. This is fitted to the cart, and is furnished with iron stays for locking it to the body of the cart and to the shafts.
20. Corn and Hay Cart. This is the frame or body only, the wheels and axle of the common cart being applied to it when required.
21. Wheel-Barrow. Of the common construction.
22. Corn Wheel-Barrow. This barrow is used for carrying sheaves from the barn-yard to the barn, when the thrashing machine is at work.

23. Hand-Barrow. The common open hand-barrow.
24. Cheese Press. In this machine the pressure is produced by a combination of wheel and pinion, with a lever and weights. The whole is of cast-iron.
25. Churning Machine. This churn works in a vertical position, and may be impelled by manual or other power.

Besides the above models in this division, there are all the other subsidiary implements, such as Shovels, Forks, Rakes, Scythes, Weeding-Hooks, Hoes, and the numerous other similar implements employed upon the farm, which are better illustrated by the actual implements than by models.

DIVISION II.

GENERAL PROGRESSIVE SERIES OF MODELS OF AGRICULTURAL IMPLEMENTS AND MACHINES.

- | | |
|---|------|
| 1. Syrian Plough, from Nazareth. Presented by W. R. Wilson, Esq., | 1821 |
| 2. Norwegian Plough. ditto ditto | 1824 |
| 3. Ditto ditto ditto | 1824 |
| 4. Swedish Plough. ditto ditto | 1824 |
| 5. Ditto ditto ditto | 1824 |
| 6. Welsh Plough. Presented by Mr Grierson. . . . | 1829 |
| 7. Common Plough. | |
| 8. Ditto, with Friction-Wheels; by Mr White, Biggar, . | 1819 |
| 9. Common Plough. | |
| 10. Red Plough. By Mr Finlayson, Muirkirk. | |
| 11. Plough, with Shifting Beam, &c. | |
| 12. Subsoil Plough. Invented by Mr Smith of Deanston. Shewn
at Glasgow. | 1828 |
| This plough is drawn by four horses,—penetrates in stiff
subsoils to the depth of 16 inches, following in the furrow of
the common plough. Its use is for stirring without turning
up the subsoil.—Trans. vol. viii. | |
| 13. Implement for Cross-cutting New Ground, or Old Ley Lands;
by Mr Andrew Brown, Carrabus, Island of Islay.—Trans.
vol. vii. | 1829 |
| 14. Rhomboidal Harrow; by Mr Samuel. | 1813 |

15. Harrows for Wet Ground; by Mr John Morton, Clachmarais.
The object of this implement is to prevent poaching in wet land, by making the horses walk in the furrows.
16. Brake Harrow, of the common form.
17. Brake Harrow, as improved by Sir Neil Menzies, 1830
18. Grubber, communicated by Mr Shirreff of Mungo's Wells, . . 1821
19. Grubber.
20. Grubber, with seven coulter and parallel motion, for lifting the coulter frame out of the ground; invented by Mr Kirkwood of Tranent.—Trans. vol. viii. 1830
21. Horse-hoe.
22. Horse-hoe, by Mr Nicol, Guildy, Forfarshire. This implement, by means of shifting mouldboards and coulters, is intended for the cleaning and dressing of the various kinds of drilled crops.
23. Machine invented by the Earl of Strathmore for the consolidation of loose soils.
24. Mallet for pulverizing Clods.
25. Broadcast Sowing-Machine, by Mr Binning of Bathgate, . . . 1817
26. Turnip Drill Sowing-Machine.
27. Drill Sowing-Machine for Three Rows; invented by Mr Morton of Leith,
28. Double Mouldboard Plough, with apparatus attached for Sowing Turnips.
29. Turnip Drill-Machine.
30. Turnip Drill-Machine with Water Barrel attached; by Mr Grozier of Newcastle.
31. Turnip Drill-Machine with Rollers before and behind; by Mr Wightman of Upperkeith.
32. Turnip and Bone-Dust Drill-Machine combined; by Mr Nicol, Guildy, Forfarshire.—Trans. vol. viii. 1830
33. Turnip and Bone-Dust Drill Machine, by Mr Hamilton, for which a Silver Medal was voted at Dumfries, 1830
34. Hainault Scythes and Gatherers.
35. Common Scythe.
36. Reaping Machine, as invented by Mr Smith of Deanston, . . 1812
A machine on this model, worked by two horses, was used with effect on several occasions in East Lothian. The operation is performed by a circular cutter, the drum of which acts as a gatherer.
37. Reaping Machine; by Mr Archibald Kerr, Edinburgh. . . . 1813
In this model the circular cutter is also employed, but the gathering process is defective.

38. Reaping Machine, as originally invented by Mr Bell. 1827
 39. Reaping Machine, as invented by Mr Bell, for which £ 50 were
 voted. 1828

In this model the clipping principle is adopted, in combination with a very effective method of gathering, which is performed by open vanes revolving in front of the machine; these successively embrace portions of the standing corn, and hold it against the shears; the progressive motion of each vane brings the corn, when cut, to the endless web, which last ultimately deposits it on the ground, at the left side of the machine. This machine has been tried on the large scale, and performs in a very satisfactory manner.

40. Reaping Machine; by Mr John Fraser, Edinburgh.

In this model, the operation is performed by a line of shears acting simultaneously, from right to left, and from left to right, alternately.

41. Frames for Corn Stacks, for the purposes of ventilation and security against vermin; by the Earl of Mar.
 42. Frames for Hay Stacks; by the same.
 43. Hand Thrashing-Machine; presented by the Very Reverend Principal Baird.—Trans. vol. viii. 1829
 44. Machine for Hummelling Barley; by Mr Mitchell, Bortness Mill, Elgin.
 45. Winnowing Machine; by Mr Common of Denwick.
 46. Winnowing Machine; by Mr Farmer.
 47. American Hay Rake, introduced by Mr Ronaldson of Saughead, to whom the Silver Medal was voted, 1827
 48. American Hay Rake, simplified by Mr Wightman, Upper Keith.
 49. Welsh Hay Rake; presented by Mr Grierson.
 50. Two-wheeled Cart; by Mr Watt, Biggar.

In this cart, the centre of gravity of the load is brought below the axle; and, for the purpose of dragging in going down hill, the breeching harness is adapted to act upon levers that throw out friction-blocks against the fore part of each wheel. This action continues so long as the horse exerts his force in a backward direction.

51. Two-wheeled Cart, with an apparatus attached to the hinder part for spreading slaked lime upon land; by Mr Common, of Denwick.—Five Guineas voted.
 52. Cart Wheel formed entirely of malleable iron, except the nave; by Mr Sellar of Botriphney, Banffshire.

53. Crib, Rack, and Manger, of an improved construction; by Mr Young, Castle Douglas, 1831
54. Machine for Cutting open Drains in pasture lands; by Mr Vallance of Libberton, 1831
55. Drain Tiles, full size.
56. Portable Corn Mill, by Coggor and Co. of London; recommended by Sir John Sinclair. This is similar to those used by the French army in the Russian campaign.
57. Portable Corn Mill, improved by Mr Jones of London.
58. Turnip Slicer; by Mr Wightman, Upper Keith.
59. Steaming apparatus for preparing the Food of Cattle; by Mr Steel, Dumfries, 1816
60. Steaming Apparatus for preparing the Food of Cattle; by Mr Liddel, 1816
61. Churn, worked by a Wind Mill, as in actual use in the Island of Sandy, Orkney; presented by Mr Frith, 1822
62. Double Churn, worked by manual power applied to a pendulum; by Mr Vallance of Libberton, Lanarkshire.
63. Set of Cast-Iron Milk Dishes of full size; by Mr Baird of Shotts.
64. Lactometer for ascertaining the qualities of Milk; by Mrs Lovi, Edinburgh.

DIVISION III.

MISCELLANEOUS IMPLEMENTS AND INVENTIONS CONNECTED WITH AGRICULTURE AND RURAL ECONOMY.

1. Machine for Bruising and Grinding Bones for Manure, in its most improved form; by Mr Anderson of Dundee, to whom the Silver Medal and £ 10 were voted, 1829

This model represents a machine which is worked by a steam-engine of ten horse power.—Trans. vol. vii.
2. Method of Ventilating Granaries in a more perfect manner than usual; by Mr Wilson, Woodhouselee.
3. Self-acting Ventilator.
4. Tripod Machine, with Tackle and Windlass, for lifting sitfast stones in fields without the expense of excavation; presented by Professor Low of Edinburgh.

In using this machine, a hole is jumped in the stone about to be raised; the machine is placed over the stone, the iron plug

is inserted in the hole, and fixed only by a few taps of a hammer, which gives it sufficient hold to resist the force exerted through the tackle and windlass to lift the stone, which can then be placed upon a cart.—Trans. vol. vii.

5. Self-acting Gate for Parks and Pleasure-Grounds; by Mr Russel, Denny Loanhead, 1830

This gate is opened and shut, as the case may require, by the weight of the carriages in passing over a species of weigh-bridge, placed at a little distance on either side of the gate; the action is communicated by trains of levers, catches, and connecting rods.—Trans. vol. viii.

6. Field Gate with self-acting Stop; by Mr Russel, Kirkcaldy. 1831

The opening of the second leaf of this gate acts upon a moveable inclined plane, placed under ground, by means of a connecting rod from a lever on the heel of the gate, whereby the stop is made to descend, leaving no obstacle in the way of horses' feet.

7. Field Gate, constructed with four bars, and one entire diagonal brace supporting the extremity of the gate from the top of the heel post; by Mr Menteath of Closeburn.

8. Field Gates, constructed with four bars, and half diagonal braces, hinged on the face of the post, so as to fall back on the hedge or wall when opened. These gates are formed on the principle of extreme of lightness as consistent with strength; by Mr Hunter of Thurston.—Trans. vol. vii.

9. Machine for compressing Peat-Moss, so as to render it more easily dried, more portable, and better adapted for fuel. Presented by Mr Linning of Colzium. 1831

10. Mountain Sledge, adapted to the conveyance of hay, peats, &c. in hilly districts, with a *Drag* or Friction Coulter, to retard the machine in descending steep hills. Invented by Mr Cook, of Yetholm.—Trans. vol. viii. 1830

11. Lime-Kiln, of the oval shape, with bookers, conical cover, and lid adapted to the same, whereby the heat can be duly regulated. Presented by Mr Menteith of Closeburn. 1829

12. Lime-Kiln of the egg-shape, by do. 1829

13. Do. do. by do. 1829

14. Do. of the oblong shape, Mr John Michie, Gourdie, Limeworks, 1829

15. Janker or Carriage, adapted to the easy loading and conveyance of timber.

16. Do. do.

17. Trough for a Figgery; by Mr Baird of Shotts.

18. Trough for a Piggery, for which a Premium was awarded to Mr Bell, Newton-Ayr. 1828
19. Instrument for Measuring the Height of Growing Trees; by Mr Monteith, wood-forester.

DIVISION IV.

ROADS, BRIDGES, AND APPARATUS THEREWITH CONNECTED.

1. Foot-Bridge, erected over the Gala Water, of 50 feet span, entirely of malleable iron, except the platform of roadway, being the first bridge erected in Scotland of this material on the instant principle; by Mr Hyslop, Fountainhall. 1819
2. Method of Constructing Foot-Bridges, by a series of *Extensor* levers in malleable iron; proposed by Mr R. Leck. 1823
3. Carriage-Bridge, constructed of Timber over the river Arde, at Pitcarmick, Perthshire, of 54 feet span and 12 feet wide, at an expense of £90, including the masonry of the abutments. Presented by Mr Fergusson of Woodhill. 1831

The roadway of the bridge is supported on six trussed frames, in which the main bearing timbers are very light, but so arranged as to form continuous arches from the one abutment to the other; and the parts thus brought under compression being placed to resist in the direction of their length, are sufficient, notwithstanding their lightness, to sustain the portions of the load distributed over them; the model is on a scale of $\frac{1}{4}$ -inch to a foot.

4. Machine for Breaking Stones for Highways; by Sir Neil Menzies of Castle-Menzies.
5. Road Harrow, for collecting the stray materials into the ruts of roads.
6. Road Machine for the same purpose; by Mr Martin Clachmarais, Elgin.
7. Snow Plough for clearing Highways of drifted snow; by Mr Allan, Penicuik.
8. Cast-iron *Road-tracks*, adapted to the wheels of common carts, for easing the draught of horses on acclivities in roads; by Mr Baird of Shotts.
9. Cast-iron Road-tracks on a further improved plan; by Mr Baird of Shotts.

10. Levelling Instrument, for ascertaining the difference of level between two points, or the proportional vertical rise in relation to horizontal distance, applicable to road-making, draining, &c.; by Graham Dalryel, Esq.—Trans. vol. v. 1820
11. Levelling Instrument for the same purposes, still more simplified; by the same. 1820
12. Odometer at full size; invented by Mr Hunter of Thurston.—Trans. vol. v. 1821
 This way-wiser is in the simplest form that this useful instrument has hitherto been constructed.
13. Odometer, by Mr Lyon.
14. Levelling Instrument, applicable to road-making and draining; invented by Mr Hunter of Thurston.—Trans. vol. viii. 1829
 This instrument can be made of three slips of deal by any common workman, in a very short space of time, and may be used by any person accustomed to the use of the common level or plummet. It is adapted to ascertain either the whole vertical rise or fall between two points in distance, or to afford on inspection the proportional rise or fall in terms of the length.

DIVISION V.

MACHINES, &c., INVENTED OR IMPROVED WITH A VIEW TO THE ADVANCEMENT OF GENERAL IMPROVEMENT IN SCOTLAND.

Section 1.

1. Boat adapted to the application of Manual Power, for propelling boats or vessels in calms by the aid of machinery. Presented by Admiral Sir David Milne. 1823
2. Steam-boat, with oblique Rotatory Paddles placed over the stern of the vessel, and having their plane of revolution at right angles with the keel, proposed for Canal Navigation; by Mr Wilson, Edinburgh. 1829
3. Steam-boat, laid out for the stowage and conveyance of Live Stock from distant parts of the Highlands or other places; by Mr Hedderwick, Leith.—Trans. vol. vii. 1828
4. Models, Nos. 1, 2, 3, 4, shewing the principles of a proposed improvement in the construction of the Hull of Merchant Ships, by which great additional strength and security are given to the vessel; by Mr Ballingall, Kirkcaldy; Silver Medal voted. 1831

5. Cork Dress, proposed as the means of giving buoyancy to persons in danger of drowning by shipwreck or otherwise. Invented by Mr Mollison, Glasgow. 1827
6. Improved Machinery for working a Ship's Rudder; by Mr Petrie, formerly keeper of the Society's Models. 1830

Section 2.—Hydraulic Machines.

1. Self-acting Pump; invented by Mr Hunter of Thurston. 1819

In this hydro-pneumatic machine, a stream of water is received into a cistern, and admitted into communication with a vessel placed at a given distance below the cistern, by means of connecting pipes. Through these, and by the intervention of valves and levers, a species of intermitting circulation is produced. The effect of this circulation is to raise through an ascending pipe which rises above the cistern, nearly one-half the quantity of water received into it. The height to which the ascending column can be raised, will be always equal to the difference of level between the cistern and the bottom of the lower vessel, however much or little that difference may be. The remaining half of the stream received into the cistern is wasted off through a valve in the bottom of the lower vessel.—

See Trans. vol. v. 1819

2. Improved Syphon, which can be kept constantly charged by means of a small basin attached to each of its extremities, and a stop-cock at the apex; by Mr Hunter of Thurston.—Trans. vol. v. 1820

3. Self-regulating Apparatus for the supply of water to Mills, whereby the sluice of the Reservoir opens and shuts according to the supply, and the quantity of water required is discharged without waste. The principle has been successfully adopted at the Rothsay Mills, and on the Shaws Water-works at Greenock. Invented by Mr Thom of Rothsay, to whom a piece of plate Fifteen Guineas value was voted by the Society.

4. Fire-Engine; by Mr Ruthven, Edinburgh. 1831

This is a portable engine, at full size, on Mr Ruthven's new patent principle. The power being applied in a horizontal direction, any number of men can be employed upon the engine, through the medium of drag ropes. Much ingenuity is displayed in the formation of the parallel motion of the piston rods.—See Trans. vol. ix.

5. Fire-Engine, with the requisite apparatus; by Mr Yates, Edinburgh.

Section 3.—Railroads.

1. Method of raising Loaded Waggon from one level to another on a Railroad; by Mr Walker, Carron. 1819

The method proposed by Mr Walker is the lock or perpendicular lift; the waggon being placed upon platforms which are raised or lowered by the draught-horses applied to a horse gin, one waggon being raised while another is lowering.

2. Method of raising Loaded Waggon from one level to another on a Railroad; by Mr Walker, Lauriston. 1819

In this model, the object proposed is obtained by a lock or perpendicular lift, and worked on the same principle as in the last.

3. Method of raising Loaded Waggon from one level to another on a Railroad; by Mr Ruthven, Edinburgh 1819

Mr Ruthven proposes to effect his object by the application of his patent drag and propellers upon an inclined plane; the drag being applied when descending, and the propellers when ascending,

4. Method of raising Loaded Waggon from one level to another on a Railroad; by Mr A. Witherspoon, Tranent. 1819

Mr Witherspoon also proposes, to adopt the inclined plane, but with rack-rails; the waggon being furnished with a pair of spur wheels, which are brought into gear with the rack when the waggon is on the plane.

5. Method proposed for raising Loaded Waggon from a lower to a higher level on a Railroad; by Mr Scott of Ormiston. 1822

Mr Scott proposes the double inclined plane, at an angle of 45° , with two lines of rail on each, and a carriage with wheels, arranged in such a manner as to keep the carriage always horizontal, and these never travelling beyond the inclined plane. When the carriage is either at top or bottom of the inclined plane, its surface is on a level with the respective railroad; the waggon are thus easily moved to or from the carriage. The power may be either manual, animal, or steam, according to circumstances.—Trans. vol. vi.

6. Method proposed for raising Loaded Waggon from a lower to a higher Level on a Railroad. By Mr John Ruthven, Edinburgh, 1822

In this method the common inclined plane is adopted with a single railroad. The power, which is supposed to be manual,

is applied through the intervention of Mr Ruthven's eccentric wheel and axle, or "New method of procuring mechanical power." In lowering the waggons of the descending train, the drag or common brake is employed.

7. Method proposed for raising Loaded Waggons from a lower to a higher Level on a Railroad. 1822

In this model, the object is gained by a perpendicular lift. The waggon being placed upon a platform, the draught-horse is employed as a moving power; the machine is a gin, which turns a vertical screw, and in so doing, a nut is made to traverse from the top to the bottom of the screw, or the reverse. To the nut is attached a chain or a rope, the other end of which is attached to the platform, but passing over two intermediate pulleys. The descent of the nut and chain causes the ascent of the platform and waggon, and *vice versa*.

8. Method proposed for raising Loaded Waggons from a lower to a higher Level on a Railroad. By Mr Walker, Carron. 1820

In this model, the work is also proposed to be done by applying the horse in a gin, and raising the waggon on a platform, by a perpendicular lift.

9. Railroad Waggon, proposed by Mr Walker, Carron, in which the wheels are adapted to either the railroad or common road, without the necessity of shifting the wheels of the waggon or cart.

10. Railroad Waggon Wheels, illustrative of an easy mode of engaging and disengaging the wheels to or from the waggon, by means of latches embracing half the diameter of the inner head of the nave, by Messrs Aird and Dunlop, Ayr Colliery.—Trans. vol. viii. 1829

Section 4.—Miscellaneous.

1. Dynamometer of Regnier, for ascertaining the Draught of Horses, &c.; by Mr Innes, Edinburgh.
2. Dynamometer of Regnier, for ascertaining the Draught of Horses, &c.; by Mr Innes, Edinburgh.
3. Balance, by Mr Campbell, Glasgow. 1813
4. Farm and Family Steelyard, mounted by Mr Ruthven, Edinburgh. 1829

In using this steelyard, one weight only is required. The scale is ingeniously contrived for the convenient discharge of the commodities after being weighed.—Trans. vol. vii.

5. Weighing Machine or Steelyard for loaded Carts, exhibiting a cart in the situation of being weighed.
6. Dynamometer, in which the force exerted is indicated by the height of a column of mercury; invented by Mr Mylne, architect, Edinburgh.
7. Two boxes containing Plans and Drawings of a Windmill, taken from one in actual operation. Presented by Mr Bruce of Kennet.
8. Machine illustrative of Mr Ruthven's Patent of a "New method of procuring mechanical power, by means of eccentric wheels and pinion;" by Mr Ruthven, Edinburgh.—Trans. vol. vi. 1819
9. New method of procuring a Rotatory from a Reciprocating Motion, by the alternate action of two ratchet-wheels and catches; by Mr Marshall, Dundee.
10. Self-balancing Crane. Presented by the Earl of Strathmore. 1831
 This crane, by means of two jibs and two chain-barrels, can be worked so as to keep always in equilibrium, thereby sustaining the load with safety, without the aid of guy-ropes.
11. Circular Saw for felling Trees, by Mr Jack of Craigdallie, for which twelve guineas were voted, as the best machine in the competition.—Trans. vol. ix. 1831
12. Reciprocating Saw for felling Trees; by Mr Vallance of Libberton. 1831
13. Circular Saw for felling Trees; by Mr Alex. Gordon, Aberdeen .1831
14. Reciprocating Saw for felling Trees; by Mr Gibson, Kirkcaldy. 1881
15. Circular Saw for felling Trees; by Mr Vallance, Libberton. 1830
16. Pruning Saw. Presented by Mr White. 1831
 Intended for lopping off the smaller branches of trees. Its action is by embracing the branch, and the longer arms of the lever being kept together by the hand, it is worked backward and forward until the branch is cut off.
17. Foresters' Pruning Saw, for cutting branches beyond the reach of the workman without a ladder; by Mr Robison. 1831
18. Lever-Press proposed for the compression of Peat-Moss; by Mr Ruthven, Edinburgh.
19. Instrument, at full size, for being attached to the common boring-rods, to bring up, from any required depth, specimens of the mineral substances that have been penetrated by the borer; by Mr Busby, mineral engineer.—Trans. vol. vii. 1822
20. Apparatus for boring through Quicksands, by means of an improved Sludger, worked through a column of cast-iron pipes,

- which are forced down as the sand is withdrawn through them ;
by Mr Busby, mineral engineer.—Trans. vol. vii. . . . 1822
11. Apparatus for digging Pits through Quicksand and Gravel ; by
Mr Busby.—Trans. vol. vi. 1822
12. Improved Bee-hive, composed of a number of wooden frames or
leaves, capable of being removed singly and at pleasure, being
of great advantage in the removal and carriage of Bee-hives ;
by Mr Young, Garmouth. 1828
23. Apparatus intended to be attached to Bee-hives, for giving alarm
when they swarm ; by Mr Walker, Coulter.
24. Printer's Inking-box, to be used with composition-rollers, for
distributing the ink over the types. Invented by Mr Dun-
can Macqueen, Edinburgh. 1819
25. Piling Engine, invented by Mr Petrie, late keeper of the So-
ciety's models. 1819
- In this piling engine, the ram is lifted by an endless chain,
having studs upon it at certain distances, that catch and sus-
pend the ram, until being lifted to the height of the top-
roller, the returning of the studs over the roller disengages the
ram, and allows it to fall.
26. Piling Engine, in which the ram is disengaged by the rope slip-
ping off the periphery of an endless-screw-pulley ; by Mr Alex-
ander Simpson, Falkirk. 1828
27. Water-wheel proposed for working in an open or tide-river, with
an apparatus for raising or lowering the wheel as the surface
of the water rises or falls ; by Mr Clerk, Carmacuen, Monal-
trie. 1817

DIVISION VI.

INVENTIONS AND IMPROVEMENTS CONNECTED WITH DOMESTIC ECONOMY.

1. Self-regulating Callender or Mangle, with two rollers and com-
pressing screw ; invented by Mr Dalyell, Edinburgh. . . . 1817
2. Model, showing the walls and general arrangement of an im-
proved Cottage, consisting of two apartments, heated by one
common chimney ; by Mr Menteath of Closeburn.
3. Non-combustible Dress adapted for Females, to be thrown round
the person in the event of the common dress taking fire ; by
Mr Johnson of Glasgow.

4. Machine for cleaning Chimneys, without the use of Climbing-Boys, and worked entirely from below; by Mr White of Had-dington.—Trans. vol. vi. 1822
 The machine ascends in the chimney, by the operator pulling a cord, which causes a pair of bent levers to expand and fix themselves between the sides of the flue; by the operator continuing to pull on the same cord, a set of brushes ascend through a certain space in the chimney. By pulling now upon a second cord, the levers collapse and make another ascent, the machine being in the mean time supported by the friction of the brushes; and so on to the top of the chimney.
5. Instrument for cleaning Chimneys, by means of a rope from the top of the chimney, and another from below.
6. Stove in general use in the Netherlands for heating apartments; presented by the Earl of Elgin.—Trans. vol. vi. 1822
7. Grate which consumes its Smoke, by Mr Scott of Queensferry. 1823
8. Improved Grate, by Mr Steel of Dumfries. 1818
9. Laundry Smoothing-iron heated by boiling water, by Mr Johnston of Glasgow. 1822

LIST OF MEMBERS
OF
THE HIGHLAND SOCIETY OF SCOTLAND

AT 1ST NOVEMBER 1832,

**ALPHABETICALLY ARRANGED, AND DISTINGUISHING THE YEAR OF
THEIR ADMISSION.**

PRESIDENT,
HIS GRACE WALTER FRANCIS
DUKE OF BUCCLEUCH AND QUEENSBERRY, K. T.

The Members marked thus *, have been Presidents; and thus †, Vice-Presidents. Those with § prefixed to their names, are the only *original* constituent Members of the Society now surviving.

New Members are admitted at the General Meetings of the Society by Ballot. There are two such meetings annually, viz. the Anniversary Meeting, on the second Tuesday of January, and the Summer General Meeting, on such day in June or July as may be fixed by the Directors, and intimated in terms of the Charter. Members pay an Annual Contribution of £1 : 3 : 6; or, in their option, and in full of all future claims, a Life Subscription of Twelve Guineas.

LIST OF MEMBERS.

	Admitted
* ARGYLE, His Grace George William, Duke of	1790
† AILSA, The Most Noble Archibald, Marquis of	1793
† AIRLY, The Right Hon. David, Earl of	1819
† ABOYNE, The Right Hon. George, Earl of, K. T.	1793
ABERDEEN, The Right Hon. George, Earl of, K. T.	1805
† ARBUTHNOT, The Right Hon. John, Viscount of	1803
† ABERCROMBY, The Right Hon. George, Lord	1799
ADAM, The Right Hon. William, Lord Chief-Commissioner	1816
ARBUTHNOT, Major-General the Honourable Hugh, M. P. for Kincardineshire	1811
10 ABERCROMBY, The Hon. George Ralph, <i>younger of Tul-libody</i>	1825
AGNEW, Sir Andrew, <i>of Lochnaw</i> , Bart. M. P. for Wigtonshire	1829
ABERCROMBY, Sir Robert, <i>of Birkenbog and Forglen</i> , Bart.	1816
ANTROBUS, Sir Edmund, <i>of Rutherford</i> , Bart.	1829
ANSTRUTHER, Sir Ralph Abercromby, <i>of Balcaskie and Watten</i> , Bart.	1832
Adair, John <i>of Genoch</i>	1829
Adam, Rear-Admiral Charles, <i>of Barns</i> , M. P. for Kincross-shire	1829
Adam, James, W. S.	1807
Agnew, Colonel Vans, <i>of Sheuchan</i>	1829
Ainslie, Major-General George	1803
20 Ainslie, John, <i>of Maxpofole</i>	1831
Ainslie, P. B., <i>residing at Donibristle House</i>	1826
Aitchison, Francis, Merchant, <i>Leith</i>	1831
Aitchison, James, <i>St Clement's Wells</i>	1822
Aitchison, William, <i>younger of Drummore</i>	1809
Aiton, Rev. John, Minister <i>of Dolphington</i>	1826

		Admitted
	Alexander, Boyd, third son of the late Claud Alexander, <i>of Ballamyle</i>	1823
	Alexander, Claud, <i>of Ballamyle</i>	1810
	Alexander, Captain James Edward, <i>late 16th Lancers</i>	1831
	Alexander, W. Maxwell, <i>of Southbar</i>	1823
30	Alison, William, <i>younger of Westfield</i>	1826
	Allan, John <i>of Linkfield</i>	1824
	Allan, Thomas, <i>of Lauriston, Banker, Edinburgh</i>	1814
	Allan, William, <i>of Glen and Hillside</i>	1830
	Allardyce, Robert Barclay, <i>of Urie</i>	1810
	Allardyce, James, <i>of Boynsmill</i>	1830
	Allen, James, Merchant, <i>Grangemouth</i>	1815
	Allen, Lieut.-Col. James, <i>of Inchmartin</i>	1821
	Allen, John Lee, <i>of Errol</i>	1821
	Alston, John, Manufacturer, <i>Glasgow</i>	1827
40	Alves, Archibald, <i>late of Springfield</i>	1797
	Anderson, Adam, LL.D. Rector of Perth Academy	1829
	Anderson, Alex., late Agent at Inverness for Bank of Scotland	1823
	Anderson, David, <i>of Moredun</i>	1825
	Anderson, David, <i>of St Germain's</i>	1829
	Anderson, George, <i>younger of Gladswood</i>	1827
	Anderson, James, Deputy-Clerk of Justiciary	1820
	Anderson, Major John, <i>of Candacraig</i>	1819
	Anderson, John, <i>of Gladswood</i>	1819
	Anderson, John, W. S.	1821
50	Anderson, Michael, Coates House, <i>Edinburgh</i>	1831
	Anderson, Thomas, <i>of Craigance, Advocate</i>	1832
	Andrew, John, <i>Fettes Row, Edinburgh</i>	1829
	Anstruther, James, W. S.	1827
	Arbuthnot, Thomas, <i>of Meethall</i>	1829
	Ashworth, Thomas, <i>of Turton, Secretary to the Man- chester Agricultural Society</i>	1828
	Aytoun, Roger, W. S.	1820
	Aytoun, Roger, Banker, <i>Greenock</i>	1826

B

	BEDFORD, His Grace John, Duke of	1824
*	BUCCLEUCH and QUEENSBERRY, His Grace Walter Francis, Duke of, K. T. President of the Society	1828
60	BUTE, The Most Noble John, Marquis of	1815
† §	BREADALBANE, The Most Noble John, Marquis of	1784
	BUCHAN, The Right Hon. Henry David, Earl of	1811

		Admitted
	BELHAVEN and STENTON, The Right Hon. Robert, Lord	1816
	BEXLEY, The Right Hon. Nicholas, Lord, Hon. Mem.	1801
	BOYLE, Right Hon. David, Lord Justice-Clerk	1804
	BALGRAY, The Hon. Lord	1800
	BRUCE, Sir Michael, <i>of Scotstown and Stenhouse</i> , Bart.	1825
	BLAIR, Sir David Hunter, <i>of Brownhills</i> , Bart.	1801
	BAIRD, Dame Ann Preston Campbell, Lady, <i>of Fernton</i>	1809
70	BAILLIE, Sir William, <i>of Polkemmet</i> , Bart.	1818
	BALLINGALL, Sir George, M. D., Prof. of Military Surgery in the University of Edinburgh	1821
§	BANNATYNE, Sir W., Macleod, <i>Whiteford House</i>	1784
	BERESFORD, Admiral Sir John P., Bart. M. P.	1822
	BRISBANE, Lieutenant-General Sir Thomas M., <i>of Brisbane and Makerstown</i> , G. C. B.	1801
	Baikie, James, <i>of Tankerness</i>	1818
	Baillie, Charles, Advocate	1831
	Baillie, Ewen, <i>younger of Dochfour</i>	1824
	Baillie, George, <i>of Jerviswood</i>	1800
	Baillie, Lieutenant-Colonel John, <i>of Leys</i>	1818
80	Baillie, Robert Granberry, <i>of Coulterallers</i>	1819
	Baird, Rev. Dr George H., Principal of the University of Edinburgh, Chaplain of the Society	1793
	Baird, John, <i>of Shotts Iron-Works</i>	1815
	Baird, Thomas Elder, <i>younger of Forneth</i> , Advocate	1827
	Bald, Robert, Civil-Engineer, <i>Edinburgh</i>	1828
	Balfour, Charles, W. S.	1825
	Balfour, Francis, <i>of Fernie</i>	1824
	Balfour, James, <i>of Whittinghame</i> , M. P.	1821
	Balfour, James, <i>of Pilrig</i> , W. S.	1824
	Balfour, John, <i>of Trenaby</i> ,	1822
90	Balfour, Major-General Robert, <i>of Balbirnie</i>	1830
	Balfour, Thomas, <i>younger of Elwick</i> , Advocate	1832
	Balfour, Captain William, <i>of Elwick</i>	1819
	Balfour, William, Merchant, <i>Glasgow</i>	1820
	Ballantyne, James, <i>younger of Castlehill</i> , Advocate	1822
	Ballantyne, James, <i>of Holylee</i>	1832
	Balleny, William, Merchant, <i>Leith</i>	1828
	Banks, Robert, <i>of Craighead</i> , <i>Stirling</i>	1819
	Bannerman, Charles, <i>of Crimmonmogate</i>	1828
	Bannerman, Lieutenant-Colonel John, <i>late of Madras</i>	1801
100	Bannerman, Patrick, Advocate, <i>Aberdeen</i>	1825
	Barker, John, Surgeon, <i>Edinburgh</i>	1821
	Barns, Major-General James Stevenson, <i>of Kirkhill</i>	1803
	Bartlemore, Alexander, <i>of Seabrae</i>	1825

		Admitted
	Bauchope, Robert, Factor for his Grace the Duke of Hamilton, <i>at Kinneil</i> ,	1831
	Bayley, Isaac, Writer, <i>Edinburgh</i>	1828
	Bayne, Dr James, Physician, <i>Inverness</i>	1813
	Beatson, David, <i>of Kirkpottie</i>	1828
	Beatson, H. Dundas, Captain, Swift Revenue Cutter	1809
	Beatson, Thomas, <i>of Mawhill</i>	1829
110	Beattie, Thomas, <i>of Cruive</i>	1821
	Begbie, Alexander, <i>of Pinnaclehill</i>	1832
	Beith, John, Banker, <i>Campbeltown</i>	1826
	Belches, Alexander Hepburn Murray, <i>of Invermay</i>	1824
	Belches, Major John H. Murray, <i>at Invermay</i>	1825
	Bell, Carlyle. W. S. one of the Principal Clerks of the City of Edinburgh	1824
	Bell, Geo. Jos. Professor of the Law of Scotland, Uni- versity of Edinburgh	1802
	Bell, George, Merchant, <i>Leith</i>	1826
	Bell, John, <i>of Dunaby</i>	1821
	Bell, Robert, Advocate	1823
120	Bell, William, W. S.	1813
	Berry, William <i>of Tayfield</i>	1800
	Bertram, Gilbert, Merchant, <i>Leith</i>	1805
	Bertram, William, <i>at Cranshaws</i>	1826
	Bethune, Gilbert, <i>of Balfour</i>	1806
	Beveridge, Thomas, Depute-Clerk of Session	1816
	Binning, David Monro, <i>of Softlaw</i> , one of the Commis- sioners of the Customs, London	1799
	Binning, George Monro, <i>younger of Softlaw</i> , Advocate	1831
	Black, John, <i>of Ardmarnock</i>	1819
	Blackburn, John, <i>of Killearn</i>	1827
130	Blackwood, William, Bookseller, <i>Edinburgh</i>	1830
	Blaikie, James, <i>of Craigiebuckler</i> , Advocate, <i>Aberdeen</i>	1825
	Blair, David Anderson, <i>of Inchyra</i>	1819
	Blair, David, <i>of Cookston</i>	1809
	Blair, David, <i>younger of Cookston</i>	1826
	Blair, Forbes Hunter, <i>of Dunskey</i>	1808
	Blair, James, <i>of Penninghame</i> , M. P.	1827
	Blair, William, <i>of Blair</i> , M. P. for Ayrshire	1821
	Blair, William, <i>of Avonton</i>	1817
	Bogue, Adam, <i>of Woodhall</i>	1822
140	Bonar, Andrew, Banker, <i>Edinburgh</i>	1824
	Bonar, John, <i>of Kimmerghame</i> , Banker, <i>Edinburgh</i>	1818
	Bonar, John, <i>of Ratho</i>	1822
	Bonar, William, Banker, <i>Edinburgh</i>	1828

		Admitted
	Bontine, R. Cunningham, <i>of Ardoch</i>	1823
	Borthwick, George Augustus, M. D., <i>Edinburgh</i>	1817
	Borthwick, John, <i>of Crookston</i>	1812
	Borthwick, William Hay, <i>of Hopesrig</i>	1821
	Boswall, Captain John Donaldson, R. N.,	1814
	Boswell, John, <i>of Kingcaussie and Balmuto</i>	1823
150	Boswell, William, Advocate, Sheriff of Berwickshire	1803
	Bowie, John, <i>of Camsiscan, W. S.</i>	1815
	Boyd, Edward, <i>of Mertonhall</i>	1813
	Boyd, John, <i>of Broadmeadows</i>	1804
	Boyle, Colonel John, <i>of She Walton</i>	1801
	Brander, Lieut.-Colonel James, <i>of Pitgaveny</i>	1827
	Brander, James, Banker, <i>Golspie</i>	1830
	Bremner, Charles, W. S.	1800
	Briggs, Major John Falconer, <i>of Strathairly</i>	1828
	Brodie, Alexander, <i>Barnie Mains</i>	1822
160	Brodie, James Campbell, <i>of Lethen</i>	1831
	Brodie, John, <i>of Scoughall</i>	1822
	Brodie, Wm., <i>of Brodie</i>	1821
	Brodie, William, <i>Upper Keith</i>	1822
	Brown, Alex., Merchant, <i>Aberdeen</i>	1825
	Brown, Alexander, Writer, Elgin, Secretary Morayshire Farmer Club	1832
	Brown, George, <i>of Blairfield</i>	1828
	Brown, Hugh, <i>of Broadstone, Ayrshire</i>	1823
	Brown, Lieutenant J. D., <i>Markle, East Lothian</i>	1821
	Brown, James, Accountant, <i>Edinburgh</i>	1816
170	Brown, John, <i>of Coultermains</i>	1807
	Brown, John Osborn, W. S.	1799
	Brown, Matthew, <i>Port-Glasgow</i>	1832
	Brown, Peter, <i>at Linkwood, Elgin</i>	1821
	Brown, Robert, Factor on the Estate of Hamilton	1802
	Brown, Capt. Samuel, R. N., <i>residing at Inverleith-House</i>	1829
	Brown, Thomas, <i>of Langfine</i>	1832
	Brown, William, Merchant, <i>Glasgow</i>	1828
	Browne, Isaac Hawkins, Honorary Member	1798
	Bruce, Charles Lennox Cuming, <i>of Roseile and Kinnaird,</i> M. P.	1817
180	Bruce, John, <i>younger of Sumburgh</i>	1829
	Bruce, Oneziphorous Tyndall, <i>of Falkland</i>	1829
	Bruce, Robert, <i>of Symbister, Zetland</i>	1807
	Bruce, Robert, <i>of Kennet</i>	1819
	Bruce, Robert, Advocate, Sheriff of Argyllshire	1823

	Bruce, Thomas, <i>of Arnot</i> , late one of the Commissioners of Customs for Scotland	1820
	Bruce, Thomas, <i>of Langlee</i> , W. S.	1828
	Bryce, Rev. James, D. D., Minister of the Scots Church, <i>Calcutta</i>	1813
	Buchan, George, <i>of Kelloe</i>	1826
	Buchan, Robert, <i>George Street, Edinburgh</i>	1817
190	Buchanan, Alexander, <i>Arnprior</i>	1819
	Buchanan, Andrew Carrick, <i>at Drumpellier</i>	1827
	Buchanan, Archibald, <i>of Auchintorlie</i>	1828
	Buchanan, David Snodgrass, <i>of Cuninghamehead</i>	1803
	Buchanan, the Rev. George Craig, <i>of Mackeanston</i>	1814
	Buchanan, George, <i>of Finnich Melise</i>	1830
	Buchanan, Jas. <i>late of Buenos Ayres, residing at Edinburgh</i>	1820
	Buchanan, John, <i>of Ardoch</i>	1805
	Buchanan, John Cross, <i>of Auchintoshan</i>	1824
	Buchanan, John, Wine-Merchant, <i>Glasgow</i>	1827
200	Buchanan, John, <i>at Finnich</i>	1831
	Buchanan, Peter, <i>of Auchmar</i>	1818
	Buchanan, Robert Carrick, <i>of Drumpellier</i>	1827
	Buchanan, Robert, <i>Glasgow</i>	1811
	Buchanan, William, Merchant, <i>Glasgow</i>	1828
	Burn, James, W. S.	1825
	Burn, William, Architect, <i>Edinburgh</i>	1824
	Burnett, John, <i>of Kemnay</i>	1809
	Burnett, Lieut.-General William, <i>of Banchory Lodge</i>	1813
	Burnett, Thomas, <i>younger of Leys</i>	1824
210	Burnett, Thomas, Advocate, <i>Aberdeen</i>	1825
	Burt, Dr Robert, Physician, <i>Edinburgh</i>	1813
	Burt, John, Surgeon, <i>Edinburgh</i>	1831
	Butter, Archibald, <i>of Faskally</i>	1825

C

	CAITHNESS, The Right Hon. Alexander, Earl of	1814
†	CATHCART, General, Right Hon. William, Earl of, K. T.	1807
	CAWDOR, The Right Hon. John Frederick, Earl of	1831
	CAMPBELL, The Right Hon. Lord John	1798
	CRAIGIE, The Honourable Lord	1791
	CRINGLETIE, The Honourable Lord	1806
220	COREHOUSE, The Honourable Lord	1819
	CATHCART, Colonel, the Hon. Frederick Macadam, <i>of Craigengillan</i>	1830
	CARMICHAEL, Sir Thomas Gibson, <i>of Castlecraig</i> , Bart.	1806

		Admitted
	CAMPBELL, Sir W. P. Hume, <i>of Marchmont</i> , Bart.	1817
	CUNNINGHAME, Colonel Sir James Montgomery, <i>of Fearness</i> , Bart.	1807
	CLERK, Sir George, <i>of Penicuik</i> , Bart. M.P. for Edinburghshire	1812
	COLQUHOUN, Sir James, <i>of Luss</i> , Bart.	1801
	CAMPBELL, Sir Archibald, <i>of Succoth</i> , Bart.	1813
	CAMPBELL, Sir John, <i>of Airds</i> , Bart.	1787
	CAMERON, Sir Duncan, <i>of Fasfern</i> , Bart.	1800
230	CAMPBELL, Major-General Sir Colin, K. C. B.	1816
	COCHRANE, Captain Sir Thomas, Royal Navy, K. C. B.	1817
	CAMPBELL, Sir James, G. C. B.	1797
	Caird, James, <i>of Drumfad</i>	1814
	Calderwood, Thomas Durham, <i>of Polton</i>	1822
	Callender, James Henry, <i>of Craigforth</i>	1830
	Callender, William Burn, <i>of Prestonhall</i>	1818
	Cameron, Alexander, <i>Surinam</i>	1819
	Cameron, Allan, <i>North Uist</i>	1803
	Cameron, Donald Charles, <i>of Foxhall</i>	1825
240	Cameron, Gordon, <i>of Letterfindlay</i>	1806
	Cameron, John, <i>Corrychoiley and Gleneaves</i>	1826
	Cameron, Lieutenant-Colonel Robert, <i>late of Madras</i>	1804
	Cameron, William Mouatt, <i>younger of Scatsta</i>	1830
	Campbell, Lieutenant-Colonel Alexander, <i>of Ballochyle</i>	1807
	Campbell, Lieutenant-Colonel Alexander, <i>of Possill</i>	1810
	Campbell, Captain Alexander, <i>of Brackley</i>	1806
	Campbell, Alexander, <i>late of Tobago</i>	1799
	Campbell, Alexander, <i>Greenock</i>	1804
	Campbell, Alexander, <i>of Elderline</i>	1807
250	Campbell, Alexander, <i>of Strond</i>	1829
	Campbell, Alexander Brodie, <i>of Fornightly</i> , Hon. East India Company's Service	1816
	Campbell, Archibald, <i>of Jura</i>	1789
	Campbell, Archibald, <i>of Blythswood</i>	1800
	Campbell, Archibald, <i>of Drumsainey</i>	1808
	Campbell, Archibald, <i>of Catrinebank</i>	1810
	Campbell, Archibald, <i>of Askomel</i> , Captain Royal Artillery	1810
	Campbell, Captain Archibald, Chamberlain to his Grace the Duke of Argyll	1811
	Campbell, Archibald James, <i>of Kilpatrick</i>	1824
	Campbell, Archibald, <i>of Glendaruel</i>	1826
260	Campbell, Archibald, <i>Camusearnie Cottage</i> , Factor on the estate of Menzies	1832

	Admitted
Campbell, Arthur, W. S.	1816
Campbell, Charles, <i>of Combie</i>	1808
Campbell, Colin, <i>Albyn Place, Edinburgh</i>	1810
Campbell, Colin, <i>at Posill</i>	1829
Campbell, Major Donald, <i>of Knock</i>	1806
Campbell, Donald, <i>of Dunstaffnage</i>	1823
§ Campbell, General Duncan, <i>of Lochnell</i>	1784
Campbell, Dugald, <i>of Kildaloig</i>	1813
Campbell, Dugald, <i>of Illandrie</i>	1805
270 Campbell, Major, Dugald, Royal Artillery	1818
Campbell, Duncan, <i>of Ross</i>	1823
Campbell, Duncan, <i>late at Ardgower</i>	1802
Campbell, Henry Fletcher, <i>of Boquhan</i>	1823
Campbell, James Muir, <i>Ayr</i>	1825
Campbell, James, <i>younger of Jura</i>	1827
Campbell, Colonel James, <i>late of Madras</i>	1801
Campbell, James, <i>younger of Craigie, Advocate</i>	1824
Campbell, John, <i>of Craignure</i>	1803
Campbell, John, <i>of Stonefield</i>	1808
280 Campbell, John, <i>of Glen Sattel</i>	1817
Campbell, John, <i>of Blairhall</i>	1819
Campbell, John, <i>of Southhall</i>	1821
Campbell, John, <i>younger of Otter</i>	1827
Campbell, John, <i>of Strachur</i>	1829
Campbell, Lieutenant-Colonel John, H. E. I. C. Service	1817
Campbell, Colonel John, <i>of Blackhall</i>	1803
Campbell, John Archibald, W. S.	1813
Campbell, John, <i>of Carbrook, W. S.</i>	1793
Campbell, John, <i>of Lincoln's Inn</i>	1800
290 Campbell, John, W. S. <i>now of London</i>	1787
Campbell, John, <i>late of Lochend</i>	1803
Campbell, John, <i>younger of Airds</i>	1829
Campbell, Lorne, Factor to the Duke of Argyle <i>at Rose- neath</i>	1824
Campbell Mungo Nutter, <i>of Ballymore</i>	1824
Campbell, Mungo, <i>of Hallyards</i>	1832
Campbell, Captain Patrick, <i>of Inveraw</i>	1799
Campbell, Rear-Admiral Patrick	1819
Campbell, Captain Peter, H. E. I. C. Naval Service	1819
Campbell, Richard, <i>of Craigie</i>	1829
300 Campbell, Major-General Robert, <i>of Kintarbert</i>	1789
Campbell, Robert Nutter, <i>of Kailzie</i>	1798

	Admitted
Campbell, Robert, <i>of Sonochan</i>	1802
Campbell, Robert, <i>younger of Auchmannoch</i>	1816
Campbell, Rose, <i>late of Spain</i>	1809
Campbell, Walter Frederick, <i>of Islay</i> , M.P. for Argyleshire	1817
Campbell, Walter, <i>of Sunderland</i>	1818
Campbell, William, <i>of Netherplace</i>	1810
Campbell, William, W. S.	1805
Canning, James, <i>residing at Shiels</i>	1813
310 Carmichael, Maurice, <i>of Eastend</i>	1827
Carmichael, Michael, <i>younger of Eastend</i>	1825
Carnaby, Thomas, General Clerk of Lieutenancy, <i>Forfarshire</i>	1831
Carnegy, David, <i>of Craigo</i>	1825
Carnegy, William Fullarton, <i>of Boysack</i>	1824
Carnegy, James, <i>of Balnamoon</i>	1813
Carruthers, Alexander, <i>of Warmanbie</i>	1826
Carruthers, Lieutenant-Colonel J., <i>of Denby</i>	1824
Carruthers, William Thomas, <i>of Dormont</i>	1823
Cassels, David, <i>of Arnprior</i>	1824
320 Cathcart, Elias, <i>of Blairston</i> , Advocate	1819
Cathcart, James, Merchant, <i>Leith</i>	1805
Cathcart, John, <i>of Genoch</i>	1803
Chalmers, Alexander, <i>of Cluny and Knockorth</i>	1826
Chalmers, Charles, <i>of Monkshill, Aberdeen</i>	1824
Chalmers, Lieutenant-Colonel W., <i>of Glenerrick</i>	1822
Chancellor, Alexander, <i>of Shieldhill</i>	1818
Cheape, Captain John, <i>of Girgent</i>	1814
Cheine, Patrick, <i>Great King Street, Edinburgh</i>	1820
Cheyne, Captain Alexander, Royal Engineers, <i>Edinburgh</i>	1825
330 Cheyne, James Auchinleck, <i>of Oxendean</i> , W. S.	1825
Chisholm, Lachlin, <i>of Irin</i>	1831
Chisholm, Alexander William, <i>of Chisholm</i>	1831
Christie, Andrew, <i>of Ferrybank</i>	1813
Christie, Robert, Accountant, <i>Edinburgh</i>	1824
Clark, Robert, <i>of Comrie</i>	1810
Clason, Andrew, W. S.	1820
Cleghorn, George, <i>of Weens</i>	1821
Cleland, James, L.L. D. Superintendent of Public Works, <i>Glasgow</i>	1827
Cockburn, Patrick, Accountant, <i>Edinburgh</i>	1824
340 Colquhoun, James, <i>younger of Luss</i>	1829
Colquhoun, John Campbell, <i>of Clathick and Killermont</i>	1824
Colquhoun, John, Sheriff of Dumbartonshire	1807

	Admitted
Connell, James, <i>of Conneath</i>	1828
Cooper, Samuel, <i>of Ballindalloch</i>	1818
Corrie, Thomas, <i>of Culloch</i> , Manager British Linen Co.	1826
Couper, Peter, W. S.	1811
Cowan, Alexander, Merchant, <i>Edinburgh</i>	1810
Cowan, Duncan, Merchant, <i>Edinburgh</i>	1810
Craig, Alexander, Merchant, <i>Edinburgh</i>	1818
350 Craig, Alexander, <i>Kirkton</i>	1821
Craig, John, Merchant, <i>Edinburgh</i>	1818
Craig, William Gibson, <i>younger of Riccarton</i>	1824
Craigie, Lawrence, <i>of Glendoick</i>	1824
Craik, Douglas H., <i>of Arbigland</i>	1822
Crawford, Charles, <i>East Fortune</i>	1822
Crawford, John Innes, <i>of Bellfield</i>	1815
Crawford, John, <i>Duncan Street, Newington</i>	1826
Crawford, John, <i>of Auchinanes</i>	1818
Crawford, William Macknight, <i>of Cartsburn</i>	1809
360 Crawford, William Howison, <i>of Crawfordland</i>	1809
Crawford, John, late British Resident at Java	1819
Crichton, Thomas, <i>of Auchinskeoch</i> , Advocate, Chamberlain to the Duke of Buccleuch	1795
Crichton, John, <i>of Friarscarse</i>	1830
Crombie, Alexander, <i>of Phesdo</i>	1827
Crow, James, <i>at Kinraig</i>	1826
Cruickshanks, James, <i>of Langleypark</i>	1829
Cunningham, Colonel John, <i>of Newton</i>	1829
Cunningham, John, <i>of Duchrae</i>	1830
Cunningham, William, <i>of Lainshaw</i>	1810
370 Cunningham, William, <i>at Goodleyburn</i>	1830
Cunninghame, William, <i>of Craigends</i>	1828
Currie, William, <i>of Linthill</i>	1832
Cuthbertson, Archibald, <i>Peanston</i>	1822
Cuthbertson, Donald, Accountant, <i>Glasgow</i>	1827
Cuthbertson, James, <i>Seton Mains</i>	1824

D

† DALHOUSIE, Lieutenant-General the Right Hon. George, Earl of, G. C. B.	1804
§ DUFFUS, The Right Hon. Benjamin, Lord	1784
DOUGLAS, The Right Hon. Archibald, Lord	1825
DUNDAS, The Right Hon. Lawrence, Lord	1800
380 DUNDAS, The Right Hon. Wm., Lord Clerk-Register	1801
DUFF, Lieutenant-General the Hon. Alexander	1814

		Admitted
	DOUGLAS, Hon. Charles, <i>of Douglas</i> , M. P. for Lanarkshire	1806
	DUNBAR, The Hon. Robert, <i>of Latheron Wheel</i>	1832
	DALYELL, Sir James, <i>of Binns</i> , Bart.	1798
	DENHAM, General Sir James Stewart, <i>of Coltness</i> , Bart.	1800
	DALRYMPLE, Lieutenant-General Sir John Hamilton, <i>of Cranstoun and Cousland</i> , Bart.	1817
	DUNBAR, Sir Archibald, <i>of Northfield</i> , Bart.	1794
	DICK, Sir Robert Keith, <i>of Prestonfield</i> , Bart.	1816
	DOUGLAS, Sir J. Scott, <i>of Springwood Park</i> , Bart.	1823
390	DUNBAR, Sir James, <i>of Boath</i> , Bart. R. N.	1802
	DUNDAS, Sir Robert, <i>of Dunira</i> , Bart.	1793
	DRUMMOND, Sir F. Walker, <i>of Hawthornden</i> , Bart.	1823
	DURHAM, Vice-Adm. Sir P. Henderson, <i>of Fordel</i> , G. C. B.	1823
	DALLAS, Major-General Sir Thomas, Knight	1805
	D'ESTE, Colonel Sir Augustus Frederick	1822
	Dallas, James, Merchant, <i>Edinburgh</i>	1819
	Dalrymple, Major-General John, <i>of North Berwick</i>	1823
	Dalyell, John, <i>of Lingo</i>	1823
	Dalyell, John Graham, Advocate	1807
400	Darling, Thomas, S. S. C.	1821
	Darroch, Lieutenant-General Duncan, <i>of Gourrock</i>	1830
	Daubeny, Robert Henry, <i>of Bristol</i>	1826
	Davidson, Duncan, <i>of Tulloch</i>	1824
	Davidson, Duncan, <i>of Tillychety</i>	1824
	Davidson, Henry, <i>Haddington</i>	1809
	Davidson, Hugh, <i>of Cantray</i>	1831
	Davidson, James Gillespie, W. S.	1819
	Davidson, James, <i>Milnholm</i> , Factor to his Grace the Duke of Buccleuch	1828
	Davidson, John James, W. S.	1824
410	Davidson, Laurence, W. S.	1829
	Davidson, Robert, Advocate	1819
	Davidson, William, <i>of Hatton</i>	1809
	Dempster, George, <i>of Skibo</i>	1823
	Dennistoun, James, <i>of Dennistoun</i>	1822
	Dennistoun, James, <i>younger of Dennistoun</i>	1829
	Dennistoun, James, <i>of Golfhill</i> , Banker, <i>Glasgow</i>	1827
	Dewar, Alexander Cumming, <i>Vogrie</i> , 15th Regiment Bengal Native Infantry	1832
	Dewar, John, Advocate	1830
	Dick, David, <i>of Glenshiel</i>	1814
420	Dick, John, Advocate	1827
	Dick, Colonel Sir R. H., <i>of Tullimet</i>	1828

	Admitted
Dick, William, <i>younger of Pitkarro</i>	1828
Dickson, Andrew, <i>of Alton</i>	1823
Dickson, Archibald, <i>of Huntlaw</i>	1823
Dickson, George, late Merchant, <i>Calcutta</i>	1830
Dickson, George, <i>of Belchester</i>	1831
Dickson, John, <i>of Kilbucko and Hartree</i>	1802
Dillon, John, <i>Glasgow</i>	1800
Dixon, John, <i>of Daldowie</i> , Merchant, <i>Glasgow</i>	1827
430 Dixon, William, <i>of Govan</i> , Merchant, <i>Glasgow</i>	1827
Don, General Alexander, Lieutenant-Governor of Gibraltar	1804
Donaldson, John, <i>of Aucharn</i> , W. S.	1812
Douglas, Archibald, <i>of Adderstone</i>	1822
Douglas, Archibald, Advocate	1823
Douglas, George, Advocate, Sheriff of Kincardineshire	1800
Douglas, John, <i>of Lockerby</i>	1825
Douglas, Robert, <i>of Brighton</i>	1831
Douglas, Lieut.-Col. William, late of the 85th Regiment	1803
Douglas, William Robert Keith, M. P.	1819
440 Downie, Robert, <i>of Appin</i>	1814
Dron, William, <i>of Blackruthven</i>	1829
Drummond, Rear-Admiral Adam, <i>of Megginch</i>	1822
Drummond, George Harley, late of <i>Drumtochty</i>	1810
Drummond, Henry Home, <i>of Blair Drummond</i>	1809
Drummond, Thomas, <i>younger of Newton</i>	1828
Dudgeon, Alexander, <i>of St Helen's</i>	1826
Dudgeon, Patrick, <i>of Eastcraigs</i> , W. S.	1827
Dudgeon, Robert, Merchant, <i>Leith</i>	1828
Dudgeon, William, Merchant, <i>Leith</i>	1826
450 Duff, Adam, Advocate, Sheriff of Edinburgh	1813
Duff, Arthur, <i>of Cocklaw</i>	1832
Duff, Garden, <i>of Hatton</i>	1814
Duff, James Grant, <i>of Eden</i>	1828
Duff, Robert William, <i>of Fetteresso</i>	1804
Duff, Robert, <i>younger of Fetteresso</i>	1823
Duff, Richard Wharton, <i>of Orton</i> , Comptroller of Excise	1805
Dunbar, Major P., 3d Regiment of Bengal Cavalry	1823
Duncan, Alexander, <i>of Glendivine</i>	1824
Duncan, James, <i>at Cargill</i>	1826
460 Duncan, James, Merchant, <i>Leith</i>	1826
Duncan, James J., <i>of Garthamlock</i>	1830
Dundas, David, <i>younger of Dunira</i>	1828
Dundas, Gabriel Hamilton, <i>of Duddingston</i>	1823
Dundas, Robert, <i>of Arniston</i>	1820

	Admitted
Dundas, Robert Adam, M. P.	1825
Dunlop, Alexander, Advocate	1828
Dunlop, Archibald, Distiller, <i>Haddington</i>	1823
Dunlop, Campbell, <i>Enterkine House</i>	1832
Dunlop, James, <i>of Annanhill</i>	1824
470 Dunlop, James, W. S.	1823
Dunlop, John Colin, Advocate, Sheriff of Renfrewshire	1824
Dunlop, William, Merchant, <i>Edinburgh</i>	1820
Dunn, William, <i>of Kilbowie</i> , Merchant, <i>Glasgow</i>	1827
Dunsmure, James, Secretary Herring Fishery Board	1817
Durham, Lieutenant-General James, <i>of Largo</i>	1823
Dyson, Thomas C. <i>of Willowfield</i> , Halifax, Yorkshire	1832

E

† ELGIN & KINCARDINE, The Right Hon. Thomas, Earl of, K. C.	1818
† ELCHO, The Right Hon. Francis, Lord	1819
ELLIOT, Sir William, <i>of Stobbs</i> , Bart.	1823
480 EDMONSTONE, Sir Archibald, <i>of Duntreath</i> , Bart.	1821
ELPHINSTONE, Sir Robert Dalrymple Horn, <i>of Logie- Elphinstone</i> , Bart.	1813
Eddington, James, <i>of Gargunnoch</i>	1814
Eddington, Thomas, Merchant, <i>Glasgow</i>	1813
Edmonstone, Archibald, <i>of Spittal</i>	1819
Edmonstone, James, <i>of Newton</i>	1798
Elder, John, Merchant, <i>Slate</i>	1815
Elliot, George Scott, <i>of Larriston</i>	1813
Elliot, James, <i>of Wolfie</i>	1826
Elliot, Theodore F., <i>at Braco Castle</i> , Captain Engineers H. E. I. C. S.	1824
490 Ellis, William, S. S. C.	1821
Elphinstone, Lieutenant-Colonel John	1827
Erskine, James, <i>of Cambus</i>	1808
Erskine, John James, <i>Clathic</i> , late one of the Members of Council Prince of Wales Island	1823
Erskine, Col. William Howe Knight, <i>of Pitodrie</i>	1820
Evans, J., <i>of Dacre</i> , near Penrith	1832
Ewing, James, LL. D., <i>of Dunoon Castle</i> , Merchant, <i>Glasgow</i>	1827
Ewing, Robert, Merchant, <i>Greenock</i>	1830

F

†	FIFE, The Right Hon. James, Earl of, K. T., G. C. B.	1805
	FINGAL, The Right Hon. the Earl of	1810
500	FORBES, The Right Hon. James Ochonchar, Lord	1831
	FLEMING, Vice-Admiral the Hon. Charles Elphinstone, of <i>Biggar and Cumbernauld</i>	1824
	FLAHAULT, Charles, Count Mercer De	1821
	FORBES, Sir John Stuart, of <i>Pitsligo and Fettercairn</i> , Bart., Treasurer of the Society	1830
	FORBES, Sir John, of <i>Craigievar</i> , Bart.	1832
	FERGUSON, Sir James, of <i>Kilkerran</i> , Bart.	1805
	FETTES, Sir William, of <i>Comely Bank</i> , Bart.	1801
	FORBES, Sir Charles, of <i>New and Edinglassie</i> , Bart. M. P.	1814
	FOULIS, Sir James, of <i>Woodhall</i> , Bart.	1816
	FERGUSON, Sir Adam, Knight, Keeper of the Regalia	1799
510	Fairbairn, T., late of <i>St Vincent's</i>	1802
	Fairlie, James, of <i>Holmes</i>	1827
	Falconar, David, of <i>Carlowrie</i>	1807
	Falconer, Æneas, <i>Blackhills</i>	1810
	Falconer, Cosmo, of <i>Hartwoodhill</i>	1805
	Falconer, Peter, at <i>Craigelachie</i>	1821
	Farquhar, Lieutenant-Colonel William, Madras Engineers, late British Resident at Singapore	1827
	Farquhar, Captain, R. N. C. B.	1826
	Farquharson, Andrew, of <i>Breda</i>	1800
	Farquharson, Archibald, of <i>Finzean</i>	1815
520	Farquharson, Major-Gen. James Alex., Governor of St Lucia	1819
	Farquharson, James, of <i>Invercauld</i>	1831
	Farquharson, John, of <i>Haughton</i>	1808
	Farrie, John, Chief Magistrate, <i>Greenock</i>	1831
	Fergus, John, of <i>Strathore</i>	1832
	Ferguson, George, of <i>Pitfour</i>	1828
	Ferguson, James, of <i>Kinmundy</i>	1826
	Ferguson, John, of <i>Stronvar</i>	1805
	Ferguson, John, of <i>Knockindale</i>	1824
	Ferguson, Robert, of <i>Raith</i>	1825
530	Ferguson, Robert Cutlar, of <i>Craigdarroch</i> , M. P.	1826
	Fergusson, Adam, of <i>Woodhill</i>	1807
	Fergusson, Major-General Archibald, of <i>Dunfallandie</i>	1824
	Fergusson, Charles, younger of <i>Kilkerran</i> , Advocate	1826
	Fergusson, James, of <i>Crosshill</i> , Principal Clerk of Session	1800
	Fergusson, James, W. S.	1826
	Fergusson, Lieutenant-Colonel James, of <i>Huntly Burn</i>	1831

		Admitted
	Fergusson, John, Wine-Merchant, <i>Leith</i>	1826
	Ferrie, Robert, <i>of Blairtumnock</i>	1827
	Ferrier, John, W. S.	1796
540	Ferrier, Louis H., <i>of Belleside</i>	1825
	Finlay, Kirkman, <i>of Castle Toward</i>	1814
	Finlay, James, <i>younger of Castle Toward</i>	1826
	Finlay, William Warwick, <i>younger of Trees</i>	1826
	Fisher, Daniel, S. S. C.	1819
	Fisher, James, M. D., late Staff Surgeon to the Army in Canada	1821
	Fleming, Robert, <i>Minto Street, Edinburgh</i>	1829
	Fleming, William Malcolm, <i>of Barrochan</i> , Vice-Lieutenant of the County of Renfrew	1832
	Flemyng, Robert Stewart, <i>of Killiechassie</i>	1826
	Fletcher, Angus, <i>of Dunans</i> , Advocate	1826
550	Flyter, Robert, Sheriff-Substitute Fort William	1821
	Forbes, Alexander, <i>of Inverernan</i>	1822
	Forbes, Charles, <i>of Asloun</i> , second son of Sir Charles Forbes, Bart. M. P.	1823
	Forbes, Rev. Dr George, <i>of Blelack</i>	1803
	Forbes, George, Banker, <i>Edinburgh</i>	1817
	Forbes, George, <i>of Auchnagathil</i> , third son of Sir Charles Forbes, Bart. M. P.	1830
	Forbes, James Stewart, fourth son of Sir Charles Forbes, Bart. M. P.	1830
	Forbes, John, <i>younger of New and Edinglassie</i> , M. P.	1823
	Forbes, Michie, <i>of Crimond</i>	1806
	Forbes, Major-General Nathaniel, <i>of Auchernach</i>	1823
560	Forbes, William, <i>of Callander</i>	1830
	Fordyce, Thomas J., <i>of Ayton</i>	1823
	Forman, John, W. S.	1809
	Forman, John Nairne, W. S.	1831
	Forrest, James G., <i>of Comiston</i>	1805
	Forsyth, Alexander, S. S. C.	1798
	Forsyth, John, <i>Forres</i>	1826
	Fotheringham, Thomas Ogilvie, <i>of Pottrie</i>	1824
	Fowler, James, <i>of Raddrey</i>	1806
	Fraser, Alexander, <i>of Inchcoulter</i>	1805
570	Fraser, Alexander, Merchant, <i>Aberdeen</i>	1817
	Fraser, Captain Alexander, Royal Engineers	1818
	Fraser, Archibald Thomas Frederick, <i>of Abertarff</i>	1820
	Fraser, Colonel Charles, <i>of Inverallochy and Castle Fraser</i>	1816
	Fraser, George, Merchant, <i>Manchester</i>	1825

	Admitted
Fraser, Hugh, <i>of Eskadale</i>	1819
Fraser, James, <i>Redcastle House</i>	1807
Fraser, John, Cashier, <i>Cullen House</i>	1812
Fraser, John, Advocate	1802
Fraser, Robert, <i>of Torbreck</i>	1802
580 Fraser, Simon, <i>of Foyers</i>	1800
Fraser, Simon, <i>of Ford</i> , Advocate	1828
Fraser, Captain Thomas, R. N.	1817
Fraser, Thomas Alexander, <i>of Lovat</i>	1820
Fraser, Captain William, <i>residing at Brackla</i>	1809
Fraser, William, <i>of Glenmead</i> , W. S.	1816
Fullarton, Colonel S. M., <i>of Fullarton</i>	1825
Fullarton, John, <i>of Demerara, Brisbane House</i>	1825
Fullerton, Captain James, 30th Regiment	1824
Fullerton, John, <i>of Kilmichael</i>	1807
590 Fullerton, William, <i>of Skeldon</i> , Advocate	1801
Fyfe, Andrew, M. D., <i>Edinburgh</i>	1823
Fyfe, James, <i>of Smithfield</i>	1806

G

† GORDON, His Grace George, Duke of, G. C. B.	1791
† GRAHAM, The Most Noble James, Marquis of	1821
GALLOWAY, The Right Hon. George, Earl of, K. T.	1807
† § GLASGOW, The Right Honourable George, Earl of	1784
† GOWER, The Right Honourable George, Earl	1813
† GRAY, The Right Honourable Francis, Lord	1793
† GLENLYON, The Right Honourable James, Lord	1804
600 GARLIES, The Right Honourable Viscount, M. P.	1830
GREENOCK, The Right Honourable Charles, Lord	1809
GRAHAM, The Right Hon. Lord Montagu William, M. P.	1831
GOWER, The Right Hon. Lord Francis Leveson, M. P. <i>for Sutherlandshire</i>	1822
GRAHAM, The Right Hon. Sir James Robert George, <i>of</i> <i>Netherby</i> , Bart. M. P. First Lord of the Admiralty,	1830
GORDON, Captain the Honourable William, R. N., M. P. <i>for Aberdeenshire</i>	1824
GRANT, The Right Honourable Charles, M. P. <i>for Inver-</i> <i>ness-shire</i>	1816
GRANT, Colonel The Honourable Francis William, <i>of</i> <i>Grant</i> , M. P. <i>for Morayshire</i>	1803
GRAY, The Hon. John, eldest son of Lord Gray	1821
GILLIES, The Honourable Lord	1809
610 GORDON, Sir James, <i>of Letterfourie</i> , Bart.	1800

		Admitted
	GORDON, Sir John, <i>of Earlstoun</i> , Bart.	1827
	GORDON, Sir William Cumming, <i>of Altyre and Gordonston</i> , Bart.	1808
	GIBSON, Sir Alexander C. Maitland, <i>of Cliftonhall</i> , Bart.	1818
	GRANT, Sir John Peter, <i>of Rothiemurchus</i> , Knight, Barrister-at-Law, <i>Calcutta</i>	1792
	Galbraith, William, <i>younger of Blackhouse</i> , Town-Clerk, <i>Stirling</i>	1822
	Galbreath, David Stewart, <i>of Machrihanish</i>	1812
	Galloway, William, Accountant, <i>Edinburgh</i>	1814
	Garden, Alexander, Merchant, <i>Glasgow</i>	1827
	Gardiner, George, Writer, <i>Perth</i>	1828
620	Gardiner, John, <i>at Smithston</i>	1830
	Garioch, John, <i>of Heathcote</i>	1826
	Gartshore, John Murray, <i>of Gartshore</i>	1825
	Geddes, Adam G., <i>Airfield, Dalkeith</i>	1819
	Gibbons, Edward, Factor to Macleod <i>of Macleod</i>	1830
	Gibson, John, W. S.	1825
	Gibson, John jun., W. S.	1828
	Gibson, Rev. Thos., <i>of Glencrosh</i> , Minister of Lochmaben	1823
	Gilchrist, Dugald, <i>of Ospisdale</i>	1817
	Gillanders, John, <i>of Highfield</i>	1800
630	Gillespie, Alexander, Surgeon, <i>Edinburgh</i>	1806
	Gillespie, George, <i>of Biggar Park</i>	1829
	Gillespie, James, <i>of Parkhall</i>	1829
	Gillespie, Robert, Merchant, <i>London</i>	1829
	Gillespie, Thomas, <i>of Ardochy</i>	1821
	Gillespie, William, <i>Gateside</i>	1829
	Gillon, William Doune, <i>of Wallhouse</i> , M. P.	1823
	Gilmour, Walter James Little, <i>of Craigmillar</i>	1828
	Gilzean, Thomas, <i>of Bunachton</i>	1813
	Girvan, Andrew, Accountant, <i>Edinburgh</i>	1831
640	Glasford, James, <i>of Dugaldstone</i> , Advocate	1806
	Goalen, Alexander, <i>of Leith</i>	1805
	Goldie, Alexander, W. S.	1822
	Goldie, Archibald W., W. S.	1828
	Goodwin, Lieutenant-Col. Hugh Maxwell, <i>of Mount Alyn</i> , <i>Denbighshire</i>	1830
	Gordon, Lieut.-Col. Alex., late Sutherland Highlanders	1801
	Gordon, Captain Alexander, R. N.	1820
	Gordon, Alexander, <i>of Auchlunies</i>	1808
	Gordon, Alexander, <i>Great King Street, Edinburgh</i>	1817

		Admitted
	Gordon, Charles, <i>younger of Auchluchries</i>	1832
650	Gordon, David, <i>of Abergeldie</i>	1822
	Gordon, George, <i>at Huntly</i>	1829
	Gordon, Lieutenant-Colonel George, <i>of Invertronic</i>	1825
	Gordon, Harry, <i>of Knockespock</i>	1832
	Gordon, Hugh, <i>of Manar</i>	1831
	Gordon, James, <i>of Culvenan</i> , one of the Commissaries of Edinburgh	1798
	Gordon, James Farquhar, <i>of Locharwoods</i> , W. S.	1804
	Gordon, James, <i>of Revack</i>	1813
	Gordon, Colonel John, <i>of Cluny</i> , M. P.	1807
	Gordon, John David, <i>younger of Wardhouse</i>	1828
660	Gordon, John, <i>of Swinzie</i>	1807
	Gordon, John, <i>of Cairnbulg</i> , Advocate	1811
	Gordon, John, <i>of Aikenhead</i>	1814
	Gordon, John, <i>of Corstoun</i>	1829
	Gordon, John, late Major of the 2d or Queen's Regiment	1822
	Gordon, John Taylor, W. S.	1831
	Gordon, Joseph, W. S.	1804
	Gordon, Lewis, one of the Depute-Secretaries of the Society	1799
	Gordon, Michael, <i>younger of Abergeldie</i>	1831
	Gordon, Robert, <i>of Jamaica</i>	1802
670	Gordon, Thomas, <i>of Buthlaw</i>	1818
	Gordon, Lieutenant-Colonel Thomas, <i>of Park</i>	1825
	Gordon, Lieutenant-Col. W. A., late 50th Regiment	1818
	Gordon, Capt. Wm., H. E. I. C. Service, <i>residing at Newton</i>	1828
	Govan, John, W. S.	1809
	Græme, Robert, <i>of Garvock</i>	1824
	Graham, Major David, <i>of Meiklewood</i>	1831
	Graham, Frederick, Factor to the Duke of Athole	1821
	Graham, George, <i>late of Cassafuar</i>	1817
	Graham, George, <i>of Shaw</i>	1826
680	Graham, Humphrey, W. S.	1819
	Graham, James, <i>of Leitchtown</i>	1827
	Graham, James Gillespie, <i>of Orchill</i> , Architect, <i>Edinburgh</i>	1806
	Graham, John, <i>younger of Ballagan</i>	1823
	Graham, John, <i>at Newbigging</i>	1829
	Graham, Robert, <i>of Redgorton</i> , Advocate	1817
	Graham, Robert, M. D., Professor of Botany in the Uni- versity of Edinburgh	1821
	Graham, Robert, Merchant, <i>Leith</i>	1826
	Graham, William, Writer, <i>Glasgow</i>	1828

		Admitted
	Graham, William C. Cuninghame, <i>of Gartmore</i>	1796
690	Grant, Alexander, one of the Representatives in the Honourable House of Assembly, <i>Jamaica</i>	1810
	Grant, Colonel Alexander, <i>of Findrassie</i>	1826
	Grant, The Rev. Dr Andrew, one of the Ministers of St Andrew's Church, <i>Edinburgh</i>	1832
	Grant, Captain Charles, <i>Elgin</i>	1816
	Grant, David Macdowal, <i>of Arndilly</i>	1792
	Grant, Duncan, <i>younger of Bught</i> , W. S.	1825
	Grant, Frederick, <i>of Mount Cyrus</i>	1832
	Grant, George Macpherson, <i>of Ballindalloch and Invereshie</i>	1806
§	Grant, James, <i>of Corymony</i> , Advocate	1784
	Grant, James, W. S.	1793
700	Grant, James M. <i>of Glenmoriston and Moy</i>	1810
	Grant, James <i>of Bught</i>	1813
	Grant, James, Principal Tacksman of Ruthven	1827
	Grant, Rev. James, First Minister of South Leith	1828
	Grant, Captain John, <i>of Firhall</i> , <i>Nairnshire</i>	1820
	Grant, John Peter, W. S.	1823
	Grant, John, <i>of Kilgraston</i>	1819
	Grant, John Macpherson, <i>younger of Ballindalloch and Invershie</i>	1827
	Grant, Major-General Lewis, Governor of Trinidad	1826
	Grant, Patrick, <i>of Lakefeld</i>	1818
710	Grant, Robert, <i>of Kincorth</i>	1826
	Grant, Robert, <i>of Tilliefour</i>	1830
	Grant, William, <i>of Seabank</i>	1807
	Grant, W. P., <i>younger of Rothiemurchus</i>	1821
	Grassick, Charles, <i>residing at Buchaam</i>	1830
	Grassick, John, <i>Mains of Glenbucket</i>	1829
	Gray, John, Merchant, <i>Greenock</i>	1831
	Gray, Roderick, Factor for the Merchant Maiden Hospital, <i>Peterhead</i>	1829
	Greenhill, Alexander, <i>of Fearn</i> , Advocate	1825
	Greenlaw, George, <i>Hilton</i>	1796
720	Greenshields, John, <i>of Kerse</i>	1829
	Gregorson, John, <i>of Ardtornish</i>	1805
	Greig, James, <i>of Eccles</i> , W. S.	1809
	Greig, James, <i>at Tullich</i>	1821
	Grierson, William, <i>of Garroch</i> , W. S.	1828
	Gunn, George, Factor on the Estate of Sutherland	1821
	Guthrie, Major, <i>Cottage</i> , Dundee	1826

H

* HAMILTON & BRANDON, His Grace Alexander, Duke of	1804
HASTINGS, The Most Noble the Marquis of	1830
HASTINGS, The Right Hon. Flora, Marchioness of	1805
730 HOME, The Right Hon. Alexander, Earl of	1832
† HADDINGTON, The Right Hon. Thomas, Earl of	1804
HOPETOUN, The Right Hon. John, Earl of	1826
HAY, The Right Hon. Lord John, Capt. R. N.	1824
HERRIES, The Right Hon. J. C., M. P.	1829
HOPE, The Right Hon. Charles, Lord President of the Court of Session	1793
HALLYBURTON, The Hon. Douglas Gordon, <i>of Pitcur</i> , M. P.	1803
HOPE, Sir John, <i>of Craighall</i> , Bart.	1808
HAY, Sir John, <i>of Smithfield and Hayston</i> , Bart. M. P.	1811
HALL, Sir John, <i>of Dunglass</i> , Bart.	1829
740 HAMILTON, Sir Hew Dalrymple, <i>of Bargeny and North Berwick</i> , Bart.	1797
HAY, Sir James Dalrymple, <i>of Park Place</i> , Bart.	1816
HONYMAN, Sir Richard B. Johnston, <i>of Armadale</i> , Bart.	1817
HEPBURN, Sir John Buchan, <i>of Letham</i> , Bart.	1813
HOPE, Lieut. Gen. Sir John, Col. of the 72d Highlanders, K. C. B.	1824
HALLIDAY, Sir Andrew, M. D.	1806
Hagart, Thomas, <i>of Bantaskine</i>	1826
Hagart, William, late Merchant, <i>Leith</i>	1804
Haig, William, <i>younger of Dollarfield</i>	1825
Hamilton, Alexander, <i>of Grange</i> , Advocate	1787
750 Hamilton, Archibald, <i>younger of Dalzell</i>	1822
Hamilton, The Rev. G. T. Minister of Ashkirk	1810
Hamilton, Dr James, <i>of Corwar</i> , Professor of Midwifery, University of Edinburgh	1817
Hamilton, James, <i>of Kames</i> , W. S.	1807
Hamilton, James, <i>of Barns</i>	1828
Hamilton, John, <i>of Sundrum</i>	1804
Hamilton, John Ferrier, <i>of Westport</i>	1827
Hamilton, John, <i>of Fairholm</i>	1827
Hamilton, Lieut. Col. R. Campbell, <i>of Milburn and Dalserf</i>	1804
Hamilton, Robert William, Merchant, <i>Leith</i>	1814
760 Hamilton, Thomas, Architect, <i>Edinburgh</i>	1826
Hamilton, William, Merchant, <i>Glasgow</i>	1823
Hamilton, William, <i>of Craighlaw</i>	1829
Hare, James, <i>Calderhall</i>	1806

	Admitted
Hart, Major Thomas, <i>of Castlemilk</i>	1805
Harvey, Alexander, <i>of Broadland</i>	1811
Harvey, Lieut. Col. James Lee, <i>of Castlesemple</i>	1823
Harvey, John, W. S.	1811
Harvey, John, <i>of Ickwell, Bury, and Tiningly Park, Yorkshire</i>	1809
Hawthorn, Hugh, <i>of Castlewig</i>	1825
770 Hawthorn, Vans, <i>of Garthland', W. S.</i>	1802
Hawes, Benjamin, <i>of Old Barge Stairs, Blackfriars, London</i>	1808
Hawkins, John Whitsbed, <i>of Dunnichen, Advocate</i>	1819
Hay, Adam, Banker, <i>Edinburgh</i>	1825
Hay, Gen. Alexander, <i>of Rannes</i>	1812
Hay, Lieut. Col. A. Leith, <i>younger of Rannes</i>	1819
Hay, Charles, <i>of Ballindoch</i>	1825
Hay, James, <i>of Belton</i>	1820
Hay, James, Merchant, <i>Leith</i>	1828
Hay, Robert, <i>of Lawfield</i>	1807
780 Hay, William, <i>of Laxfrith</i>	1828
Hay, William, <i>of Dunse Castle</i>	1819
Hector, Alexander, Writer, <i>Edinburgh</i>	1824
Henderson, Captain David, <i>younger of Stemster</i>	1829
Henderson, Duncan, M. D., 78th Regt.	1825
Henderson, John Alexander, <i>of Westerton, 4th, or Queen's Own Light Dragoons</i>	1831
Henderson, John Irving, Advocate	1823
Henderson, William, Merchant, <i>Edinburgh</i>	1811
Henderson, William, late Secretary British Linen Company	1823
Henry, John, <i>of Corse</i>	1815
790 Hepburn, John Stewart, <i>of Colquhalzie</i>	1810
Hepburne, Robert, <i>late of Clerkington</i>	1806
Herries, William Young, <i>of Spotts</i>	1823
Heriot, John, <i>of Fellowhills</i>	1828
Heriot, James, <i>of Ramornie, W. S.</i>	1800
Hill, George Gosset, Merchant, <i>London</i>	1823
Hill, Henry David, W. S.	1825
Hill, Norman, <i>of Brownhills, Advocate</i>	1807
Hill, Robert, <i>of Firth, W. S.</i>	1800
Hood, John, <i>of Stoneridge</i>	1827
800 Home, Francis, <i>younger of Cowdenknows</i>	1829
Home, Colonel James, <i>of Broomhouse</i>	1829
Home, Dr James, <i>of Cowdenknows, Professor of Physic in the University of Edinburgh,</i>	1799

	Admitted
Home, John Forman, <i>of Wedderburn</i>	1830
Home, William Forman, <i>of Billie and Paxton</i>	1823
Hope, Archibald, <i>younger of Craighall and Pinkie</i>	1832
Hope, James, W. S.	1804
Hope, John, Dean of the Faculty of Advocates	1823
Hope, Dr Thomas Charles, Professor of Chemistry in the University of Edinburgh	1804
Horne, Archibald, Accountant, <i>Edinburgh</i>	1828
810 Horne, Donald, <i>of Langwell</i> , W. S.	1817
Horne, William, <i>of Scouthill</i> , Advocate, Sheriff of Had- dingtonshire	1813
Horrocks, John, <i>of Tullichewen Castle</i>	1818
Horsburgh, John, Factor to the Marquis of Stafford, for the Estate of Reay	1829
Horsburgh, Major William Henry	1824
Hoseason, Robert, <i>of Mossbank, Shetland</i>	1826
Hosier, James, <i>younger of Newlands</i> , Advocate	1822
Houston, Ludovick, <i>of Johnston Castle</i>	1823
Houston, Thomas, <i>of Creech</i>	1821
Howard, Lieut. Col. <i>late North British Staff</i>	1809
820 Howden, James, Jeweller, <i>Edinburgh</i>	1827
Hunt, James, <i>of Pittencrief and Logie</i>	1816
Hunter, Alexander, W. S.	1824
Hunter, Andrew, <i>of Holybush</i>	1819
Hunter, Charles, <i>residing at Templehall</i>	1826
Hunter, Charles, <i>younger of Seaside</i>	1823
Hunter, David, <i>of Blackness</i>	1826
Hunter, Duncan, <i>London</i>	1802
Hunter, George, <i>of Callander</i>	1820
Hunter, James, <i>of Thurston</i>	1812
830 Hunter, James, <i>of Templehall</i>	1823
Hunter, Capt. James, of his Majesty's 70th Regt.	1823
Hunter, James, <i>of Seaside</i>	1826
Hunter, James, <i>of Hafton</i>	1825
Hunter, William, <i>of Ormistoun</i>	1812
Hussey, Rear Admiral R., <i>of Wodd-Walton</i> , C. B. Hun- tingdonshire	1827
Hutchison, Hugh, <i>of Southfield</i>	1812
Hutchison, Robert, <i>younger of Cairngall</i>	1829
Hutchison, Thomas, <i>Mains of Tinwald</i>	1830

I

	IRVINE, Sir Paulus Emilius, Bart.	1831
840	Inglis, James P., late Merchant, <i>Leith</i>	1806
	Inglis, John, of <i>Redhull</i>	1825
	Innes, James Rose, of <i>Netherdale</i> , Advocate	1827
	Innes, Robert, younger of <i>Thrumster</i>	1824
	Irvine, Alexander Forbes, of <i>Chivas</i>	1805
	Irvine, Patrick, of <i>Inveramsay</i> , W. S.	1827
	Irving, George, Merchant, <i>London</i>	1813
	Izett, Chalmers, late of <i>Kinnaird</i>	1808
	JARDINE, Sir William, of <i>Applegirth</i> , Bart.	1823
	JARDINE, Sir Henry, of <i>Harwood</i> , Knight, King's Remembrancer of Exchequer	1799
850	Jameson, James, of <i>Drums</i>	1809
	Jameson, Robert, Prof. of Mineralogy and Natural History in the University of Edinburgh	1820
	Jameson, Robert, Advocate	1815
	Jameson, Robert, W. S.	1803
	Jardine, James, Civil Engineer, <i>Edinburgh</i>	1818
	Jardine, Thomas, <i>Moffat</i>	1829
	Jerdan, Archibald, of <i>Bonjedward</i>	1831
	Jerdan, George, writer, <i>Kelso</i> , Secretary Union Agricultural Society	1832
	Johnson, John, writer, <i>Edinburgh</i>	1823
	Johnston, George, Factor to the Earl of Eglinton	1822
860	Johnston, Alexander, W. S.	1819
	Johnston, George, jun. <i>St Cuthbert Street, Edinburgh</i>	1828
	Johnston, Henry, Surgeon, <i>Edinburgh</i>	1798
	Johnston, James, of <i>Straiton</i> , M. P.	1823
	Johnston, James, of <i>Alva</i>	1828
	Johnston, John James Hope, of <i>Annandale</i> , M. P. for Dumfriesshire	1824
	Johnston, John, Landsurveyor	1806
	Johnston, Peter, of <i>Carnsallock</i>	1803
	Johnston, Robert, Merchant, <i>Edinburgh</i>	1813
	Johnston, Captain Charles, of <i>Cowhill</i> , R. N.	1830
870	Johnston, Thomas, of <i>Underwood</i> , S. S. C.	1812
	Johnston, Walter, of <i>Chapplehill</i>	1829
	Johnstone, William, Merchant, <i>Greenock</i>	1825
	Jollie, Walter, W. S.	1829
	Jolly, David Leitch, <i>Grange of Elcho</i>	1829

Jolly, Stewart, Chamberlain to His Grace the Duke of Montrose	1827
Jopling, Thomas, <i>Coldstream</i>	1823

K

KINNOUL, The Right Honourable Thomas, Earl of	1806
KINTORE, The Right Honourable Anthony, Earl of	1826
KENMURE, The Right Honourable John, Viscount	1828
880 KELBURNE, The Right Honourable James, Viscount	1822
KINNAIRD, The Right Honourable Lord	1830
KERR, The Right Honourable Lord Robert,	1808
KINLOCH, Sir David, <i>of Gilmerton</i> , Bart.	1828
KEIR, Major-General Sir William Grant	1804
Keay, James <i>of Snaigo</i> , Advocate	1806
Keir, John, <i>of Westfield</i>	1832
Keir, Patrick Small, <i>of Kinmonth</i> , Advocate	1805
Keith, William, Accountant <i>in Edinburgh</i>	1821
Kennedy, Hugh Ferguson, <i>of Bennan and Finnaris</i>	1832
890 Kennedy, John, <i>of Milton Park, Ardwick House, Manchester</i>	1830
Kennedy, T. F. <i>of Dunure</i> , M. P.	1812
Ker, James, <i>of Blackshields</i>	1825
Kerr, John, <i>of Kerfield</i> , W. S.	1805
Kerr, Robert, Surgeon, <i>Portobello</i>	1816
Kerr, William, Merchant, <i>Leith</i>	1801
Kerr, William, retired Secretary-General of Post-Office	1789
Kidd, Alexander, writer, <i>Edinburgh</i>	1824
Kilgour, Robert, jun. <i>of Millbank</i>	1826
Kincaid, John Lennox, <i>younger of Kincaid</i>	1824
900 Kinloch, George, <i>younger of Kinloch</i> , Advocate	1825
Kinloch, John, <i>of Kilrie</i> , Lieutenant 2d Life Guards	1829
Kinnear, Charles <i>of Kinnear</i>	1824
Kinnear, George, Banker, <i>Edinburgh</i>	1803
Kinnear, Patrick, <i>younger of Lochton</i>	1823

L

† LOTHIAN, The Right Hon. John William, Marquis of	1821
LAUDERDALE, The Right Hon. James, Earl of, K. T.	1789
† LEVEN and MELVILLE, Right Hon. David, Earl of	1820
LYNDOCH, Right Hon. Lieut. Gen. Thomas, Lord, G. C. B.	1803
LIVINGSTONE, Sir Thomas, <i>of West Quarter</i> , Bart.	1815
910 LAWRIE, Sir Robert, <i>of Maxwelltown</i> , Bart.	1828
LAUDER, Sir Thomas Dick, <i>of Fountainhall</i> , Bart.	1827

		Admitted
	LOCKHART, Sir C. Macdonald, <i>of Lee and Carnwath</i> , Bart.	1817
	LISTON, Right Hon. Sir Robert, <i>of Listonshiels</i> , G. C. B.	1806
	LEES, Sir Edward S., Secretary to the General Post-Office for Scotland	1832
	LEITH, Colonel Sir Alexander, <i>of Freefield</i>	1811
	L'Amy, James, <i>of Dunkenny</i> , Sheriff of Forfarshire	1806
	Laing, Rev. Francis, Rector of Langmais, <i>Glamorganshire</i>	1824
	Lamond, James, <i>of Stranduff</i>	1827
	Lamond, Peter, Brewer, <i>Edinburgh</i>	1820
920	Lamont, Alexander, <i>of Knockdow</i> , W. S.	1819
	Lamont, James, <i>Howard Place</i> , <i>Edinburgh</i>	1824
	Lang, Alexander, <i>of Overton</i>	1801
	Laurie, Thomas, Land Valuator, <i>Edinburgh</i>	1829
	Laurie, William Kennedy, <i>of Woodhall</i>	1827
	Lawrenson, Lieut.-Col. John, <i>of Inverighty</i>	1800
	Lawson, Charles, <i>Nursery and Seedsman to the Society</i>	1830
	Lawson, John, <i>younger of Chappelton</i>	1832
	Lawson, Robert, <i>of Ballimore</i>	1813
	Learmonth, Right Hon. John, <i>Lord Provost of Edinburgh</i>	1814
930	Learmonth, Thomas, <i>of Lawrence Park</i>	1824
	Legh, Rev. Peter, <i>Golborne Park</i> , <i>Lancashire</i>	1823
	Leighton, William, Manager of the Duke of Hamilton's Coaleries	1831
	Leitch, James, Merchant, <i>Greenock</i>	1831
	Leitch, Quentin, <i>Greenock</i>	1819
	Lennox, James, <i>of Dalskuirth</i>	1830
	Leslie, Angus, <i>Prinsinain</i>	1830
	Leslie, George, <i>of Rothie</i>	1826
	Leslie, H. G. <i>of Denlugas</i>	1826
	Leslie, William, <i>of Warthill</i>	1826
940	Leny, James Macalpine, <i>of Dalswinton</i>	1824
	Limond, David, <i>of Dalblair</i>	1832
	Limond, Colonel James, late Madras Artillery	1828
	Lindsay, Lieut.-Col. James, <i>younger of Balcarras</i> , M. P.	1823
	Lindsay, John, Corn-merchant, <i>Dundee</i>	1826
	Lindsay, Patrick, Wine-merchant, <i>Leith</i>	1823
	Lindsay, Lieutenant-Colonel Martin, 78th Regiment	1816
	Linning, Michael, <i>of Colzium</i> , W. S.	1804
	Loch, James, M. P.	1822
	Loch, William, <i>of Rachan</i>	1824
950	Lockhart, Allan Elliot, <i>of Borthwickbrae</i>	1832
	Lockhart, Norman, <i>of Tarbrax</i>	1815
	Lockhart, Norman Macdonald, <i>Carnwath House</i>	1832

	Admitted.
Logan, Alexander, <i>London</i>	1831
Lorimer, James, <i>of Kellyfield</i> , Factor to the Right Honourable the Earl of Kinnoul	1826
Lorraine, Lieut.-Col. A. Dep. Gov. South Sea Castle	1827
Lothian, Edward, Advocate	1805
Louson, David, Town-Clerk of Arbroath	1813
Low, Alexander, Accountant, <i>Edinburgh</i>	1830
Low, David, <i>of Laws</i> , Professor of Agriculture in the University of Edinburgh	1825
960 Lumsden, Benjamin, <i>of Kingsford</i>	1828
Lumsden, Harry Leith, <i>of Auchindoir</i>	1822
Lumsden, Henry, <i>of Tilwhilly</i>	1830
Lumsden, Hugh, <i>of Pitcaple</i> , Advocate, Sheriff of Sutherlandshire	1825
Lundie, Archibald, W. S.	1796
Lyall, Robert, Factor to Sir J. Carnegie of Southesk, Bart.	1826
Lyon, George, <i>of Glenogle</i>	1809
Lyon, John, High School, <i>Leith</i>	1824

M

* MONTROSE, His Grace James, Duke of, K. G.	1785
MAR, The Right Honourable John Francis, Earl of	1832
970 † MORTON, The Right Honourable George Sholto, Earl of	1828
† MORAY, The Right Honourable Francis, Earl of	1793
† MANSFIELD, The Right Honourable William, Earl of	1803
MINTO, The Right Honourable Gilbert, Earl of	1808
† MELVILLE, The Right Honourable Robert, Viscount, K. T.	1798
MONTAGUE, The Right Honourable Henry James, Lord	1801
MURRAY, Lieutenant-General the Right Honourable Sir George, G. C. B., M. P. <i>for Perthshire</i>	1826
MAITLAND, Captain the Honourable Anthony, R. N., M. P.	1831
MAULE, the Honourable Fox, <i>younger of Panmure</i>	1831
MACDONALD, Honourable Archibald	1796
980 MACDONALD, Honourable Dudley	1808
MACKENZIE, The Honourable Mrs Stewart, <i>of Seaforth</i>	1816
MEADOWBANK, The Honourable Lord	1809
MACKENZIE, The Honourable Lord	1803
MEDWYN, The Honourable Lord	1802
MONCRIEFF, The Honourable Lord	1830
MAITLAND, Lieutenant-General the Hon. W. Mordaunt	1827
MACINTOSH, the Honourable Angus, of Macintosh, Captain <i>of Clanchattan</i>	1829

		Admitted
	MURRAY, The Honourable James, Advocate	1832
	MAXWELL, General Sir William, <i>of Calderwood</i> , Bart.	1804
990	MENZIES, Sir Neil, <i>of Menzies</i> , Bart.	1802
	MURRAY, the Honourable Sir Patrick, <i>of Ochlerlyre</i> , Bart.	1793
	MACKENZIE, Sir George S. <i>of Coul</i> , Bart.	1801
	MAXWELL, Major-Gen. Sir Wm. <i>of Monreith</i> , Bart.	1803
	MAXWELL, Sir John, <i>of Pollok</i> , Bart.	
	MAXWELL, Sir Patrick, <i>of Springkell</i> , Bart.	1830
	MACKENZIE, Sir Francis Alexander, <i>of Gairloch</i> , Bart.	1824
	MACKENZIE, Sir James Wemyss, <i>of Scatwell</i> , Bart.	1817
	MONTGOMERY, Sir George, <i>of Macbiehill</i> , Bart.	1805
	MACGREGOR, Sir Evan Murray, <i>of Macgregor</i> , Bart.	1801
1000	MONTGOMERY, Sir James, <i>of Stanhope</i> , Bart.	1801
	MAYWELL, Sir David, <i>of Cardoness</i> , Bart.	1810
§	MACKENZIE, Sir Alexander Muir, <i>of Delvine</i> , Bart.	1784
	MARJORIBANKS, Sir John, <i>of Lees</i> , Bart.	1814
	MILNE, Admiral Sir David, K. C. B.	1808
	MALCOLM, General Sir John, K. C. B., M. P.	1832
	Macadam, John, <i>of Blairover</i>	1824
	Macalister, Charles S., <i>of Kennox</i>	1806
	Macalister, Captain James, <i>of Springbank</i> , 13th Dragoons	1807
	Macalister, Keith Macdonald, <i>Ardincaple</i>	1829
1010	Macalister, Coll. Matt. <i>of Rosshill</i>	1797
	Macallan, James, W. S.	1823
	Macarthur, Dr Peter, <i>of Delnies</i>	1819
	Macartney, Alexander, Manager Commercial Banking Co.	1823
	Macbean, Æneas, W. S.	1812
	Macbean, Duncan, <i>of Tomatin</i> , Merchant, Glasgow	1828
	Macbean, Lieutenant-Colonel James, late 78th Regiment	1806
	Macbraire, John Joseph, <i>of Tweedhill and Broadmeadows</i>	1832
	Macaskill, Hugh, <i>of Tallisker</i>	1830
	Maccheyne, Adam, W. S.	1819
1020	Maccormick, Samuel, Advocate, Sheriff of Buteshire	1819
	Maccorquodale, Hugh, Merchant, <i>Liverpool</i>	1803
	Macrummen, Donald, Merchant, <i>Leith</i>	1821
	Macrummen, Captain John, 11th Regiment of Foot	1821
	Macculloch, John, <i>of Barholm</i>	1810
	Macdiarmid, John, <i>Dumfries</i>	1827
	Macdonald, Alexander, <i>of Rhue</i>	1824
	Macdonald, Captain Alexander, Royal Horse Artillery	1810
	Macdonald, Colonel Alexander, late 74th Regiment	1793
	Macdonald, Lieutenant-Colonel Alexander, 76th Regiment	1811
1030	Macdonald, Captain Angus, <i>of Milltown</i>	1799

	Admitted
Macdonald, Angus, <i>of Glenaladale</i>	1827
Macdonald, Coll, <i>of Dalness, W. S.</i>	1790
Macdonald, Lieut.-Col. D. Robertson, <i>of Kinlochmoidart</i>	1805
Macdonald, Major Donald, <i>of Ardmore</i>	1822
Macdonald, Captain Donald, Royal Engineers	1817
Macdonald, Donald, <i>of Craighuie</i>	1829
Macdonald, Captain Gilbert, late of the Scots Royals	1816
Macdonald, Hugh, <i>of Boisdale</i>	1820
Macdonald, Hugh P. <i>of Mougstad</i>	1830
1040 Macdonald, Captain James, <i>at Culnakyle</i>	1819
Macdonald, James, <i>younger of Dalness</i> , Advocate	1822
Macdonald, Rev. James, <i>of Kinnairdy</i>	1826
Macdonald, James, Merchant, <i>Edinburgh</i>	1828
Macdonald, James Thomas, <i>of Balranald</i>	1832
Macdonald, John, <i>of Sanda</i>	1811
Macdonald, Captain John, <i>of Springfield</i>	1797
Macdonald, Lieutenant-Colonel John, <i>of Kingsburgh</i>	1797
Macdonald, Lieut.-Col. John, <i>of Dalchoisnie</i> , 92d Regiment	1819
Macdonald, Matthew N., W. S.	1818
Macdonald, Norman, <i>of Barnisdale</i>	1789
1050 Macdonald, Major Ranald, late 92d Regiment	1823
Macdonald, Ranald, <i>of Bornish</i>	1806
Macdonald, Reginald George, <i>of Clanranald</i>	1807
Macdonald, Ranald, <i>of Staffa</i> , Sheriff of Stirlingshire, Principal Secretary of the Society	1796
Macdonald, Lieut.-Colonel Robert, Royal Horse Artillery	1814
Macdonald, Thomas, <i>Fort William</i>	1827
Macdonald, William, <i>of St Martins</i>	1802
Macdonald, Lieut.-Colonel William, <i>of Calley</i>	1813
Macdonald, William, <i>of Ballyshare</i>	1818
1060 Macdonell, Alexander, W. S., and Sheriff-Substitute of Wigtonshire	1832
Macdonell, Major General James, Coldstream Guards	1803
Macdonell, James, <i>of Milnsfield</i> , W. S.	1812
Macdonell, Captain John, <i>Killyhonet, Fort William</i>	1821
Macdounal, Colonel Andrew, <i>of Logan</i>	1801
Macdounal, Lieutenant-Colonel, C. B., <i>Stranraer</i>	1824
Macdougall, Allan, W. S.	1829
Macdougall, Colin, <i>of Lunga</i>	1808
Macdougall, Dugald, <i>of Gullanich</i>	1814
Macdougall, John, <i>of Macdougall</i> , Captain R. N.	1821
1070 Macdougall, Major Patrick, <i>of Soroba</i>	1800
Macdowal, William, <i>of Woolmet</i>	1810

		Admitted
	Macduff, Alexander, <i>of Bonhard</i>	1811
	Maceachern, Captain Colin, <i>of Oatfield</i>	1825
	Macfarlane, Alexander, <i>of Thornhill</i>	1825
	Macfarlane, Duncan, <i>Advocate</i>	1803
	Macfarlane, John, <i>of Muckroy</i>	1821
	Macfarlane, John Fletcher, <i>Surgeon, Edinburgh</i>	1823
	Macfarlane, Thomas, <i>Strachurmore</i>	1829
	Macfarlane, William Dick, <i>of Dunavour, 42d or Royal</i>	
	Highlanders	1831
1080	Macfarlane, Wm. <i>of Carse of Boquhapple</i> , late 17th Lancers	1832
	Macfie, John, <i>Merchant, Leith</i>	1823
	Macfie, William, <i>younger of Langhouse</i> , Merchant, <i>Greenock</i>	1826
	Macgillivray, Simon, <i>Merchant, London</i>	1821
	Macgillivray, William, <i>Jamaica</i>	1817
	Mackgill, David Maitland, <i>of Rankeillour</i>	1826
	Macgounie, Robert, <i>of Mains</i>	1824
	Macgregor, Alexander, jun. <i>Glasgow</i>	1823
	Macgregor, Major Hugh, late 91st Regiment	1814
	Macgregor, James, <i>of Fonab</i>	1822
1090	Macgregor, John Atholl Bannatyne, <i>younger of Macgregor</i>	1832
	Macgregor, John, <i>of Glengyle</i>	1832
	Macgregor, Major-General Murray, <i>Bengal Cavalry</i>	1801
	Macinnes, James, <i>S. S. C.</i>	1812
	Macinnes, John, <i>at Dandaleith</i>	1822
	Macinnes, John, <i>of Achinfroe and Woodburn</i>	1830
	Macinroy, James Patrick, <i>of Lude</i>	1831
	Macinroy, William, <i>of Shierglas</i>	1827
	Macintosh, George, <i>younger of Geddes and Hilton</i>	1832
	Macintosh, Lieut.-Colonel, J. J., <i>of Far</i> , <i>Madras Artillery</i>	1823
1100	Macintosh, William, <i>of Geddes and Hilton</i>	1816
	Macintosh, William, <i>of Millbank</i>	1813
	Macintosh, Donald, <i>Edinburgh</i>	1816
	Macintosh, Lachlan, <i>of Raigmore</i>	1814
	Macintyre, Donald, <i>late of Pitnacree</i>	1803
	Macintyre, Donald, <i>Writer, Glasgow</i>	1818
	Macivor, John, <i>of Ardmarnock</i>	1827
	Mackay, Major Colin Campbell, <i>of Bighouse</i>	1808
	Mackay, James, <i>Goldsmith, Edinburgh</i> , the Society's	
	Jeweller and Medalist	1804
	Mackay, Kenneth, <i>of Torboll</i>	1805
1110	Macbean, John, <i>Manager of the Scot. Life Assur. Comp.</i>	1822
	Mackellar, Reverend Angus, <i>Minister of Pencailand</i>	1818
	Mackellar, Duncan, <i>Merchant, Glasgow</i>	1809

		Admitted.
	Mackenzie, Alexander, <i>of Woodside, Inverness</i>	1802
	Mackenzie, Alexander, Sheriff-Substitute of Ross-shire	1805
	Mackenzie, Alexander, <i>of Hilton</i>	1807
	Mackenzie, Alexander, Writer, <i>Perth</i>	1829
	Mackenzie, Colin, <i>of Kilcoy</i>	1801
	Mackenzie, Major Forbes, <i>of Fodderty</i>	1829
	Mackenzie, George Falconer, <i>of Allangrange</i>	1819
1120	Mackenzie, George Ross, <i>of Aldie</i>	1819
	Mackenzie, George, <i>Dingwall</i>	1830
	Mackenzie, James William, <i>of Pittrichie</i>	1825
	Mackenzie, John W. Pitt Muir, <i>younger of Delvin</i> , Advocate	1829
	Mackenzie, John, Agent at Inverness for the Bank of Scotl.	1809
	Mackenzie, John, Writer, <i>Edinburgh</i>	1813
	Mackenzie, John Hay, <i>of Cromartie</i>	1822
	Mackenzie, John Whiteford, W. S.	1821
	Mackenzie, J. A. Stewart, <i>of Seaforth</i> , M. P.	1803
	Mackenzie, Kenneth Francis, <i>late of Park Place, Edinburgh</i>	1811
1130	Mackenzie, Murdo, <i>of Ardrross</i>	1799
	Mackenzie, Richard, <i>of Dolphington</i> , W. S. Depute-Keeper of the Signet	1809
	Mackenzie, Roderick, <i>of Glack</i>	1790
	Mackenzie, Sutherland, Manager of the Scottish Union In- surance Company	1808
	Mackenzie, Thomas, <i>of Applecross</i>	1816
	Mackenzie, William, <i>of Pülundy</i>	1801
	Mackenzie, William, <i>of Muirton</i> , W. S.	1803
	Mackenzie, William, <i>late of Calcutta</i>	1818
	Mackenzie, William Forbes, <i>of Portmore</i> , Advocate	1831
	Mackinlay, John, <i>of Rothesay</i>	1818
1140	Mackinnon, Alexander Kenneth, <i>of Skalisaig</i>	1827
	Mackinnon, Dr Farquhar, <i>of Kyle</i>	1819
	Mackinnon, Reverend John, Minister of Slate	1815
	Mackinnon, Neil, <i>of Demerara</i>	1819
	Mackinnon, William Alexander, <i>of Mackinnon</i>	1811
	Mackintosh, Charles, <i>of Aberardar</i>	1831
	Maclachlan, Donald, <i>of Scorrybreck</i>	1831
	Maclachlan, Dugald, one of the Sheriff-Substitutes of Inver- ness-shire	1832
	Maclachlan, Robert, <i>of Maclachlan</i>	1817
	Maclaine, Murdoch, <i>of Lochbuy</i>	1811
1150	Maclarty, Colin, <i>late of Jamaica</i>	1808
	Maclaren, Donald, Agent for the Leith Banking Company at Callander	1832
	Maclaren, James, <i>Gavel House, Kilsyth</i>	1832

	Admitted
MacLaurin, Malcolm, <i>Oban</i>	1803
Maclean, Colonel Alexander, <i>of Ardgower</i>	1793
Maclean, Alexander, <i>of Coll</i>	1785
Maclean, Donald, <i>of Borera</i>	1822
Maclean, Donald, W. S.	1793
Maclean, Hugh, <i>younger of Coll</i>	1809
Maclean, Hugh, <i>late of Jamaica</i>	1827
1160 Maclean, John, <i>of Killunden</i>	1822
Maclean, Dr Lachlan, Principal Tacksman of Rum	1823
Macleish, Adam, Merchant, <i>Greenock</i>	1831
Macleod, Alex. Chamberlain to Lord Macdonald, <i>Skye</i>	1829
Macleod, Alexander, <i>of Canada</i>	1811
Macleod, Alexander Norman, <i>of Harris</i>	1817
Macleod, Alexander, <i>of Muiravonside</i>	1800
Macleod, Charles Murray, Advocate,	1821
§ Macleod, Donald, <i>of Geanies</i> , Sheriff of Ross-shire	1784
1170 Macleod, Donald, <i>of Talisker</i>	1800
Macleod, Donald, <i>at Claggan</i>	1830
Macleod, Æneas R. B., <i>of Cadboll</i>	1786
Macleod, Captain Neil, <i>Gesto</i>	1799
Macleod, Major-General John, <i>of Unish</i>	1804
Macleod, John Norman, <i>of Macleod</i>	1806
Macleod, Mrs, <i>of Macleod</i>	1816
Macleod, Martin, <i>Drynoch</i>	1831
Macleod, Roderick, <i>younger of Cadboll</i>	1807
Macleod, Colonel Wm. Hon. East India Co.'s Service	1817
Macleod, William, <i>of Orbst</i>	1831
1180 Maclellan, John, Merchant, <i>Greenock</i>	1831
Macmillan, Donald, <i>of Lephenstrath</i>	1825
Macmillan, Captain Iver, of the Valentine Indiaman	1798
Macmillan, Michael, Merchant, <i>Glasgow</i>	1810
Macmillan, Thomas, <i>of Shorthope</i> , W. S.	1817
Macnab, Archibald, <i>of Macnab</i>	1806
Macnair, James, <i>of Glasgow</i>	1815
Macneale, George, <i>of Ugadale</i>	1825
Macneil, Lieutenant-Colonel Donald, late 91st Regiment	1802
Macneil, Hector Frederick, <i>of Gallochilly</i>	1812
1190 Macneil, John, <i>of Oakfield</i>	1796
Macneil, Colonel Roderick, <i>of Barra</i>	1817
Macneil, Alexander, Collector of Customs, <i>Stranraer</i>	1829
Macnicol, John, Accountant, <i>Dundee</i>	1831
Macpherson, Allen, 2. <i>Harley Place, New Road, London</i>	1822
Macpherson, Allen, <i>Kingussie</i>	1821

	Admitted
Macpherson, Colonel Duncan, Hon. E. I. C. S.	1825
Macpherson, Captain Evan, <i>of Ralia</i> , Hon. E. I. C. S.	1832
Macpherson, Ewen, <i>of Cluny Macpherson</i>	1827
Macpherson, Hugh, <i>of Eigg</i> , M. D. one of the Professors of King's College, Aberdeen	1828
1200 Macpherson, John, Factor for Lovat	1809
Macpherson, Kenneth, late Member of the Hon. House of Assembly, Jamaica	1826
Macpherson, William, <i>of Blairgowrie</i>	1822
Macquarrie, Lieutenant-Colonel Charles, <i>of Glenforsa</i>	1796
Macqueen, Captain, <i>lately residing at Corrybrough</i>	1820
Macqueen, Hugh, W. S.	1816
Macrae, Alexander, <i>of Ashkernish</i>	1832
Macrae, Colin, <i>of Demerara</i>	1823
Macritchie, Charles Elder, <i>Edinburgh</i>	1831
Macritchie, Thomas, Merchant, <i>Leith</i>	1805
1210 Macritchie, Thomas Elder, <i>of Craigton</i> , W. S.	1831
Macturk, Robert, <i>younger of Stenhouse</i>	1826
Macvicar, Major Charles, late of the 42d Regiment	1796
Macvicar, Rev. J. G., Lecturer on Natural History in the University of St Andrews	1828
Mair, Colonel Alexander, Lieut.-Gov. of Fort George	1824
Maitland, Adam, <i>of Dundrennan</i>	1802
Maitland, William, <i>of Auchlane, Gelston Castle</i>	1825
Malcolm, Neill, <i>Poltalloch</i>	1804
Malcolm, Neil, <i>younger of Poltalloch</i> , M. P.	1830
Mansfield, John, <i>of Midmar</i>	1827
1220 Mansfield, Thomas, Accountant, <i>Edinburgh</i>	1827
Marshall, Claud, Sheriff-Substitute of Greenock	1819
Marshall, David, <i>of Neilsland</i>	1828
Marshall, John, Advocate	1822
Massie, W. W., Hon. East India Comp. Civil Service	1816
Masterton, James, <i>of Braco</i>	1824
Mathie, David, <i>Glasgow</i>	1809
Maule, William, <i>Dublin Street, Edinburgh</i>	1830
Maxtone, Anthony, <i>of Cultoquhey</i>	1812
Maxwell, Henry, 2d son of Sir William Maxwell, <i>of Cal- derwood</i> , Bart.	1830
1230 Maxwell, John, <i>younger of Pollock</i>	1825
Maxwell, John Herries, <i>of Munches</i>	1826
Maxwell, Lieut.-Col., <i>of Orchardtown and Gretna</i>	1825
Maxwell, Marmaduke Constable, <i>of Terregles</i>	1830
Maxwell, W. A., <i>younger of Calderwood</i> , Major 1st or King's Dragoon Guards	1830

	Admitted
Maxwell, William Constable, <i>of Nithsdale and Erringham</i>	1830
May, John, <i>of Bradfield</i> , Merchant, <i>Glasgow</i>	1827
Mayne, Colonel John, Hon. East India Comp. Service	1831
Meek, George, <i>of Campfield</i>	1814
Megget, Thomas, W. S.	1811
1240 Meikleham, James, <i>of Cairnbroe</i>	1831
Mein, William, <i>of Ormiston</i>	1832
Melville, John Whyte, <i>of Mount-Melville</i>	1819
Menteith, Charles Granville Stewart, <i>of Closeburn</i>	1803
Menzies, Major Archibald, late of the 42d Regiment	1817
Menzies, Joseph Stewart, <i>of Foss</i>	1803
Menzies, John, <i>of Pitfodels</i>	1806
Menzies, John, <i>of Chesthill</i>	1821
Menzies, Robert, W. S., Depute Clerk of Session	1798
1250 Menzies, Robert, Land-surveyor, <i>Aberfeldy</i>	1829
Mercer, George, <i>of Gorthy</i>	1822
Mercer, Græme, <i>of Mavisbank</i>	1819
Mill, George, <i>of Blair</i>	1826
Mill, John, Merchant, <i>Edinburgh</i>	1814
Milne, David, <i>Aberdeen</i>	1826
Milne, John, Merchant, <i>Grangemouth</i>	
Millar, Andrew, Merchant, <i>Edinburgh</i>	1827
Miller, Alexander, <i>of Dalnair and Ernock</i>	1825
Miller, George, <i>of Frankfield</i>	1814
1260 Miller, Thomas Hamilton, Advocate, Sheriff of Selkirkshire	1804
Miller, Patrick, <i>Dalswinton</i>	1806
Miller, William, <i>of Monkcastle</i> , Advocate	1828
Mitchell, Colonel James, late of the 92d Regiment	1821
Mitchell, John, jun., Merchant, <i>Leith</i>	1832
Mitchell, Patrick, <i>residing at Enzean, Monymusk</i>	1831
Mitchell, William, <i>of Gordonhall</i>	1821
Mitchell, William, <i>of Parson's Green</i>	1819
Mitchelson, Arch. Hepburne, <i>of Middleton</i>	1832
Molle, William, <i>of Mains</i> , W. S.	1802
1270 Moodie, Major James, <i>of Melsetter</i>	1801
Moore, Colonel Archibald, Vice-Lieutenant of Buteshire	1810
Moore, James Carrick, <i>of Corsewell</i>	1829
More, John Shank, Advocate	1816
Moir, Charles Alexander, <i>of Leckie</i>	1814
Moir, John, Printer, <i>Edinburgh</i>	1804
Moir, Walter, Sheriff-substitute, <i>Glasgow</i>	1803
Moncrieff, Robert Scott, <i>younger of Kirkton</i> , Advocate	1831
Moncrieff, Robert Hope, <i>Perth</i>	1825

		Admitted
	Monro, Dr Alexander, Professor of Anatomy in the University of Edinburgh	1807
1280	Montgomery, Robert, Lord Treasurer Remembrancer	1829
	Monteith, Henry, <i>of Carstairs</i> , M. P.	1808
	Monypenny, Alexander, W. S.	1827
	Moray, James, <i>of Abercairney</i>	1811
	Moreland, Charles, Banker, <i>Stranraer</i>	1827
	Morison, John, <i>of Auchintoul</i>	1825
	Morison, John, W. S.	1818
	Morison, Theodore, <i>of Bognie</i>	1798
	Morton, Sam., Agricultural Implement-maker, <i>Leith Walk</i>	1822
	Morton, Robert, late Jeweller, <i>Edinburgh</i>	1812
1290	Mowat, William, <i>Garth</i>	1807
	Mowbray, John, <i>of Cambus</i>	1825
	Muir, Andrew, Merchant, <i>Greenock</i>	1826
	Muir, James, Merchant, <i>Greenock</i>	1827
	Muirhead, Claud, Publisher of the <i>Edinburgh Advertiser</i>	1820
	Mundell, Alexander, Solicitor, <i>London</i>	1805
	Mundell, Robert, <i>of Wallacehall</i>	1831
	Munro, Hugh, <i>of Teaninich</i>	1799
	Munro, Hugh Andrew Johnstone, <i>of Novar</i>	1832
	Munro, Alexander, <i>Prince's Street, Edinburgh</i>	1810
1300	Munro, Colonel William, Madras Army	1825
	Murdoch, John Burn, <i>of Coldoch</i>	1820
	Mure, James O. Lockhart, <i>of Livingstone</i>	1828
	Mure, Col William, <i>of Caldwell</i>	1804
	Mure, William, Factor to the Earl of Selkirk	1830
	Murray, Alexander, <i>of Broughton</i>	1822
	Murray, Andrew, <i>of Murrayshall</i> , Sheriff of Aberdeenshire	1804
	Murray, Anthony, <i>of Crieff</i>	1815
	Murray, Anthony, <i>younger of Dollerie</i> , W. S.	1828
	Murray, James, of the Monkland Iron-Works	1828
1310	Murray, John Archibald, Advocate	1823
	Murray, John Dalrymple, <i>of Murraythwaite</i>	1825
	Murray, John, W. S.	1811
	Murray, Joseph, <i>of Ayton</i>	1820
	Murray, Patrick, <i>of Simprim</i>	1794
	Murray, Colonel Robert Macgregor	1799
	Murray, William, <i>of Polmaise</i>	1806
	Murray, William, Banker, <i>Tain</i>	1817
	Murray, William, <i>of Banknock</i>	1827
1320	Murray, William, <i>of Henderland</i>	1826
	Murray, William, <i>younger of Ochertyre</i>	1830

Mutrie, David, Merchant, <i>Glasgow</i>	Admitted 1804
Myne, Thomas, of <i>Mylnfield</i>	1826

N

NORTHLAND, The Right Honourable Thomas, Viscount	
NAPIER, The Right Honourable William John, Lord,	1818
NAPIER, Sir William Milliken, of <i>Milliken</i> , Bart.	1820
NICHOLSON, Sir Arthur, of <i>Lochend</i> , Bart.	1812
Nairn, David, of <i>Drumkilbo</i>	1826
Nairne, James Mellis, of <i>Dunsinane</i>	1821
Nairne, James, of <i>Claremont</i> , W. S.	1829
1330 Napier, John, of <i>Mollance</i>	1822
Napier, Robert Dunmore, of <i>Ballekinrain</i>	1824
Napier, William, of <i>Blackstone</i>	1815
Neil, Major William, of <i>Barweill</i>	1824
Neill, Patrick, Secretary Caledonian Horticultural Society	1808
Neilson, Robert, of <i>Hilton</i>	1831
Newton, Abraham, Merchant, <i>Leith</i>	1828
Nicholson, Major Allan Macdonald, of <i>Ardmore</i>	1819
Nisbet, Archibald, of <i>Carphin</i>	1820
Nisbet, George More, of <i>Cairnhill</i>	1817
1340 Nivin, John, of <i>Thornton</i>	1805
Niven, William, of <i>Achalton and Kirkbride</i>	1812

O

+ ORMELIE, Right Hon. the Earl of	1819
OGILVIE, The Honourable William, of <i>Airlie</i>	1823
OGILVIE, The Honourable Donald, of <i>Clova</i>	1824
OGILVIE, Sir John, of <i>Inverquharity</i> , Bart.	1824
OSWALD, Lieut.-Gen. Sir John, of <i>Dunnikier</i> , G. C. B.	1824
ORDE, Sir John Poulet, of <i>Kilmory</i> , Bart.	1830
Ochterlony, John, of <i>Guynd</i>	1797
Ogilvie, Captain William, R. N.	1820
1350 Ogilvie, William, of <i>Chesters</i> , Advocate	1809
Oliphant, Charles, W. S.	1813
Oliphant, Laurence, of <i>Condie</i>	1828
Oliphant, James, of <i>Gask</i>	1828
Oliver, Major Archibald, of <i>Bush</i>	1832
Oliver, Thomas, <i>Lochend</i>	1825
Oliver, William, of <i>Dinlabyre</i> , Sheriff of Roxburghshire	1825
Ormiston, John A., of <i>Glenburnhall</i>	1832
Orr, Charles James Fox, of <i>Thornly Park</i> , W. S.	1816

		Admitted
	Orr, Patrick, W. S.	1825
1360	Osborne, Alexander, retired Commissioner of Customs	1805
	Oswald, James, <i>of Shieldhall</i>	1829
	Oswald Richard Alexander, <i>of Auchencruive</i>	1808
	Oswald, Lieutenant-Colonel Robert, <i>at Dunnikier</i>	1824
	PANMURE, The Right Hon. Lord	1805
	PITMILLY, David Monypenny, Lord, retired Senator of the College of Justice	1804
	PRINGLE, Sir John, <i>of Stitchell, Bart.</i> ,	1810
	Pagan, William, <i>of Linburn</i>	1800
	Parish, Woodbine, late Chairman of the Board of Excise	1819
	Parkes, Samuel, <i>of London</i>	1817
1370	Parkynes, Thomas Boulton, <i>of Oakhouse, Gloucestershire</i>	1826
	Paterson, Alexander, <i>Thurso</i>	1801
	Paterson, George, <i>of Castle Huntly</i>	1804
	Paterson, John, Factor to the Duke of Hamilton <i>in Arran</i>	1826
	Paterson, John, <i>residing at Borlum</i>	1832
	Patison, John, W. S.	1806
	Patrick, Robert, <i>of Trearne and Hazlehead</i>	1801
	Patrick, William, <i>of Roughwood, W. S.</i>	1805
	Patton, James Murray, <i>of Glenalmond</i>	1830
	Paul, Henry, <i>of Woodside, Accountant, Glasgow</i>	1830
1380	Paul, William, Accountant, <i>Edinburgh</i>	1829
	Pearson, Alexander, W. S.	1819
	Peat, Thomas, W. S.	1820
	Peddie, James, W. S.	1819
	Pedie, William, Writer, <i>Perth</i>	1828
	Pennycuik, John, <i>of Soilarie</i> , Captain 47th Regiment	1823
	Peter, John, <i>Keithick House</i>	1828
	Philp, John, Distiller, <i>Dolls</i>	1828
	Pillans, James, Merchant, <i>Leith</i>	1799
	Pitcairn, John, <i>of Pitcairns</i>	1815
1390	Playfair, William Henry, Architect, <i>Edinburgh</i>	1824
	Pollock, Arthur, Merchant, <i>Grangemouth</i>	1815
	Pringle, Alexander, <i>of Whytbank, M. P. for Selkirkshire</i>	1821
	Pringle, James, <i>of Tornwoodlee</i>	1806
	Pringle, Captain James, R. N. <i>younger of Tornwoodlee</i>	1820
	Prentice, Richard, Solicitor-at-law	1817
	Proctor, William D. <i>of Halkerton</i>	1829

Q

- † QUEENSBERRY, The Most Noble Charles, Marquis of,
K. T. 1799

R

- † ROSEBERRY, The Right Honourable Archibald John,
Earl of 1806
- † ROSLYN, The Right Honourable James, Earl of, G. C. B. 1787
- 1400 REAY, The Right Honourable Eric, Lord 1800
- RUTHVEN, The Right Honourable James, Lord 1810
- ROBERTSON, The Honourable Lord 1798
- RAE, The Right Honourable Sir William, *of St Catharines*,
Bart. 1802
- RAMSAY, The Honourable Colonel John, *of Dysart* 1824
- RAMSAY, Sir James, *of Bamff*, Bart. 1823
- RIDDELL, Sir James Milless, *of Sunart*, Bart. 1808
- RAMSAY, Sir Alexander, *of Balmain*, Bart. 1813
- RADCLIFFE, Sir Joseph, Bart. *of Millsbridge, Yorkshire* 1820
- Rae, John, Factor at Græmsay 1804
- 1410 Ramsay, Alexander, *of Demerara* 1806
- Ramsay, R. Wardlaw, *of Whitehill and Tillecoultry* 1828
- Ramsay, Captain Thomas, 1828
- Ramsay, William Ramsay, *of Barnton* 1831
- Rattray, Robert, W. S. 1805
- Rattray, Robert Clerk, *of Craighall Rattray*, Advocate 1826
- Reid, Gabriel, *of Kilcalmkill* 1820
- Reid, George, *late of Ratho Bank* 1813
- Reid, John, Merchant, *Leith* 1813
- Reid, Sylvester, W. S. Depute Clerk of Teinds 1821
- 1420 Rennie, John, *of Phantassie* 1822
- Renny, Robert Walker, Factor on the estate of Pitfour 1827
- Renny, William, W. S. Solicitor of Legacy Duties 1820
- Reoch, James, Merchant, *Leith* 1826
- Richardson, John, *of Pitfour* 1823
- Richardson, Ralph, Merchant, *Edinburgh* 1828
- Rickman, Thomas, Architect, *Birmingham*, F. S. A. 1831
- Riddell, Campbell D., Advocate 1816
- Riddell, Charles, *of Meuseley* 1831
- Riddell, John, Advocate 1817
- 1430 Rigg, J. Home, *of Morton and Downfield* 1824
- Ritchie, Henry, *of Busbie* 1820
- Robertson, Alexander, W. S. 1825
- Robertson, Andrew, Surgeon *at Crathie* 1832

	Admitted
Robertson, Captain, of <i>Kendrochet</i> , late of 88th Regiment	1825
Robertson, David, Agent for the British Linen Company, <i>Perth</i>	1829
Robertson, Captain George, of the Hon- rable East India Company's Service	1817
Robertson, George, one of the Deputy-Keepers of the Ge- neral Records of Scotland,	1819
Robertson, Dr Henry, late H. E. I. C. Medical Service, residing at <i>Callander</i>	1832
Robertson, James Stewart, of <i>Edradynate</i>	1811
1440 Robertson, James Saunders, W. S.	1816
Robertson, Captain James Walker, R. N.	1823
Robertson, James H., Banker, <i>Greenock</i>	1831
Robertson, John, <i>Ednam House, Kelso</i>	1831
Robertson, Captain John, of <i>Tullybelton</i>	1797
Robertson, Captain John, late 14th Foot	1825
Robertson, Laurence, Cashier for the Royal Bank, <i>Glasgow</i>	1828
Robertson, Patrick, Advocate	1816
Robertson, Robert, of <i>Auchleeks</i>	1828
Robertson, William, younger of <i>Kinlochmoidart</i> , Advocate	1826
1450 Robinson, George Garden, <i>Banff</i>	1811
Robison, John, Secretary to the Royal Society of Edinburgh	1830
Roger, William, Merchant, <i>Glasgow</i>	1825
Rogerson, Dr John, of <i>Wamphray</i>	1804
Rogerson, William, of <i>Gillesbie</i>	1829
Rolland, Adam, of <i>Gask</i> , Principal Clerk of Session	1832
Rose, Hugh, of <i>Holm</i>	1823
Rose, Hugh, of <i>Glastullich</i>	1824
Rose, Colonel John, of <i>Castlehill</i>	1831
Rose, William B. of <i>Rhynie</i>	1821
1460 Ross, Charles, of <i>Invercarron</i> , one of the Commissaries of Edinburgh	1821
Ross, Richard Louthian, of <i>Staffold</i>	1804
Ross, Walter, of <i>Nigg</i>	1802
Ross, William, of <i>Bridgebank</i>	1803
Roy, John James, Factor on the estate of Invercauld	1825
Roy, Robert, W. S.	1822
Russell, Claud, Accountant, Auditor of Accounts to the Society	1807
Russell, Colonel James, of <i>Ashiestiel</i>	1832
Russell, John, W. S.	1806
Ryrie, Stewart, of the Commissariat Department	1824

S

1470	SUSSEX, His Royal Highness Prince Augustus Frederick, Duke of	1806
	§ STAFFORD, The Most Noble Elizabeth, Marchioness of	1784
	† STAFFORD, The Most Noble George Granville, Marquis of, K. G.	1787
	STRATHMORE, The Right Honourable Thomas, Earl of	1820
	SELKIRK, The Right Honourable Earl of	1830
	STIRLING, The Right Honourable Alexander, Earl of	1825
	† STRATHALLAN, The Right Honourable James, Viscount	1811
	† SALTOUN, The Right Honourable Alexander George, Lord	1820
	SINCLAIR, The Right Honourable Charles, Lord	1829
	STRATHAVON, The Right Honourable Charles, Lord	1819
1480	STUART, The Right Honourable Lord James, M. P.	1819
	SHEPHERD, The Right Honourable Sir Samuel	1820
	† § SINCLAIR, The Right Hon. Sir John, <i>of Ulbster</i> , Bart.	1784
	SINCLAIR, Major, The Honourable James,	1824
	STEWART, Major-General The Honourable William	1826
	STEWART, The Honourable Charles	1826
	STUART, The Honourable John	1824
	SANDILANDS, The Honourable Robert, <i>of Torphichen</i>	1831
	SINCLAIR, Sir John Gordon, <i>of Stevenston and Murkle</i> , Bart.	1832
	STIRLING, Sir Samuel, <i>of Glorat</i> , Bart.	1809
1490	STEWART, Sir M. Shaw, <i>of Greenock and Blackhall</i> , Bart. M. P. for Renfrewshire	1814
	SCOTT, Sir William, <i>of Ancrum</i> , Bart.	1829
	STEWART, Sir John Archibald, <i>of Grandtully</i> , Bart.	1819
	STIRLING, Sir Gilbert, <i>of Rosehall</i> , Bart.	1806
	STEUART, Sir Henry, <i>of Allanton</i> , Bart.	1802
	Sandeman, David George, <i>of Springland</i>	1810
	Sandeman, David, W. S.	1831
	Sanders, James, M. D. <i>Edinburgh</i>	1818
	Sandford, Erskine Douglas, Advocate	1827
	Sands, James, <i>at Blarcessnock</i>	1817
1500	Sands, William J., H. E. I. C. Civil Service, <i>Bengal</i>	1829
	Savigny, John Horatio, <i>Buckton, near Belford</i>	1823
	Scarth, James, Merchant, <i>Leith</i>	1828
	Sceales, Andrew, of the Customs, <i>Leith</i>	1828
	Scot, Alexander, <i>of Trinity Mains</i> , W. S.	1818
	Scott, Alexander, of the Iron Foundry, <i>Dumfries</i>	1826
	Scott, Charles B. <i>of Woll</i> , W. S.	1826
	Scott, Charles, Merchant, <i>Greenock</i>	1831
	Scott, David, of Bengal Civil Service	1823

		Admitted
	Scott, Lieutenant-Colonel George, <i>Edinburgh</i>	1821
1510	Scott, George Robertson, <i>of Benholm and Hedderwick</i>	1823
	Scott, Henry Francis, <i>younger of Harden</i> , M. P. for Rox-	
	burghshire	1829
	Scott, James, <i>of Brotherton</i>	1805
	Scott, John Corse, <i>of Sinton</i>	1818
	Scott, John, <i>of Hawkhill</i>	1830
	Scott, John, <i>younger of Hawkhill</i> , Merchant, <i>Greenock</i>	1826
	Scott, Captain Robert, <i>of Abbeikhune</i>	1826
	Scott, Robert Haldane, <i>of Kinloss and Wooden</i>	1832
	Scott, Lieutenant-General Thomas, <i>of Malleny</i>	1824
	Scott, Thomas Rennie, Factor to Lord Douglas	1827
1520	Scrymgeour, James Fotheringham, <i>of Tealing</i>	1829
	Selkirk, Charles, Accountant, <i>Edinburgh</i>	1810
	Seller, Patrick, <i>of Westfield</i>	1813
	Shairp, Major Norman, <i>younger of Houston</i>	1828
	Shand, William, <i>of Arnhall</i>	1827
	Shanklie, John, Merchant, <i>Edinburgh</i>	1831
	Sharpe, Lieutenant-General M. <i>of Hoddam</i>	1830
	Shaw, Duncan, Factor to Lord Macdonald	1815
	Shearer, James, <i>of Buchromb</i>	1800
	Shepherd, James, W. S.	1828
1530	Shepperd, Alexander, Solicitor, <i>Inverness</i>	1819
	Sheriff, Charles, Sheriff-Substitute, <i>Orkney</i>	1829
	Short, Francis, <i>of Courance</i>	1804
	Simpson, Alexander, <i>at Helmsdale</i>	1821
	Simpson, Alexander, <i>Leith</i>	1828
	Simpson, Alexander Horatio, <i>Paisley</i>	1830
	Simpson, Dugald, Distiller, <i>Helmsdale</i>	1830
	Sinclair, Dugald, <i>Kilchamaig</i>	1826
	Sinclair, George, <i>younger of Ulbster</i> , M. P.	1812
	Sinclair, George Sutherland, W. S.	1832
1540	Sinclair, James, <i>of Fors</i>	1830
	Sinclair, John, <i>of Barrock</i>	1824
	Sinclair, J. W. <i>younger of Freswick</i>	1832
	Sinclair, Robert, Merchant. <i>Greenock</i>	1826
	Sinclair, William, <i>Freswick</i>	1811
	Singer, Reverend William, D. D. <i>Kirkpatrick-juxta</i>	1808
	Skene, George, <i>younger of Rubislaw</i> , Advocate	1831
	Skene, Patrick George, <i>of Hallyards</i>	1825
	Skene, William, W. S.	1831
	Skene, William Gordon Cumming, <i>of Pittlurg and Dyce</i>	1830
1550	Skinner, C. G. Macgregor, 1st Dragoon Guards	1823

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Skinner, James, <i>at Drummin</i> , Factor to the Duke of Gordon	1827
Sligo, George, <i>of Auldham</i>	1827
Sligo, John, <i>of Carmyle</i>	1827
Small, Patrick, <i>of Dirnanear</i>	1826
Smith, Alexander, <i>of Glenmillan</i> , Advocate, Aberdeen	1822
Smith, George, <i>Moffat</i> , Surgeon, R. N.	1829
Smith, James, <i>of Jordanhill</i>	1823
Smith, James, Manager of the Deanston Cotton-Works	1821
Smith, James, <i>of Craigend</i>	1825
1560 Smith, James, Merchant, <i>Leith</i>	1801
Smith, John, <i>Swinridgemuir</i>	1799
Smith, Thomas, Banker, <i>London</i>	1798
Smith, William, late M. P. for Norwich, Honorary Member	1810
Smith, William, Merchant, <i>Glasgow</i>	1823
Smollett, J. R. <i>of Bonhill</i> , Captain R. N.	1818
Smollet, Alexander, <i>younger of Bonhill</i> , Advocate	1826
Speid, Robert, <i>of Ardvie</i>	1819
Spens, Lieutenant-Colonel James, late 73d Regiment	1790
Spottiswoode, John, <i>of Spottiswoode</i>	1812
1570 Sprot, James, <i>of Spot</i>	1830
Sprot, John, <i>Picardy Place, Edinburgh</i>	1830
Sprot, Mark, <i>of Garnkirk</i> , Advocate	1820
Sprot, Mark, <i>of Riddell</i>	1830
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1580 Stevenson, Duncan, Printer to the University of Edin.	1824
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Stewart, Allen, <i>of Bonrannoch</i>	1809
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1590 Stewart, Charles, <i>of Ardsheal</i>	1794
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	Stewart, Hope, <i>of Ballechin</i>	1796
	Stewart, Captain Houston, R. N.	1822
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	Stewart, James, Merchant, <i>Greenock</i>	1825
	Stewart, Captain James, <i>of Crossmount</i>	1821
1600	Stewart, John, <i>of Belladrum and Carnousie</i>	1819
	Stewart, John Lorn, <i>of Glenbuckie</i>	1824
	Stewart, John, <i>of Dalguise</i>	1823
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	Stewart, Major Ludovick, <i>at Pittyvaich</i>	1806
1610	Stewart, Patrick Maxwell, Merchant, <i>London</i>	1813
	Stewart, Patrick, <i>of Auchlunkart</i>	1800
	Stewart, Pat. G., Agent for the Bank of Scotland, <i>Perth</i>	1829
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1630	Stirling, Major William Moray, <i>of Ardoch</i>	1825
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1660 Taylor, William, <i>of Troqueerholm</i>	1823
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	Admitted
1710 Waldie, John, <i>of Henderside</i>	1826
Walker, James, Wine Merchant, <i>Leith</i>	1800
Walker, David, Civil Engineer and Land Surveyor, <i>Aberdeen</i>	1831
Walkinshaw, Robert, <i>of Parkhouse</i> , Sheriff-clerk of Renfrewshire	1828
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Warden, Robert, <i>of Parkhill</i>	1820
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1720 Watson, George, Portrait Painter, <i>Edinburgh</i>	1826
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1730 Waugh, John, Bookseller, <i>Edinburgh</i>	1828
Wedderburn, David, <i>of Pearsie</i>	1831
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1740 Wemyss, William, <i>Cuttiehill</i>	1829
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White, Adam, <i>of Fens</i> , Merchant, <i>Leith</i>	1801
White, Alexander, Merchant, <i>Leith</i>	1829
White, John, Merchant, <i>Edinburgh</i>	1806
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Wightman, James, <i>of Courance</i>	1827
Wilkie, John, <i>of Foulden</i>	1830
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1750 Williamson, Lieut. Col. Benjamin, <i>of Marlefield</i>	1803
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Williamson, Ramsay George, <i>younger of Maxton and Braidgarhill</i>	1832
Williamson, John W., Agent for the British Linen Company, <i>Kinross</i>	1829
Williamson, Ramsay Thomas, Merchant, <i>Leith</i>	1803
Wilson, Francis, W. S.	1809
Wilson, George, <i>of Ranimore</i>	1826
Wilson, James, Sheriff-clerk, County of Edinburgh	1822
Wilson, John, <i>of Thornly</i>	1830
1760 Wilson, John, <i>of Cumledge</i>	1828
Wilson, William Rae, <i>of Kelvinbank</i>	1807
Wilson, William, Factor for the Earl of Glasgow	1804
Wilson, Wilson Dobie, Advocate	1827
Wishart, Patrick, <i>of Lockcoat</i> , W. S.	1822
Wood, George, M. D. <i>Edinburgh</i>	1815
Wood, William, Merchant, <i>Leith</i>	1828
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PREMIUMS

OFFERED BY

THE HIGHLAND SOCIETY OF SCOTLAND,

FOR PROMOTING

**AGRICULTURE AND INTERNAL IMPROVEMENT
IN SCOTLAND,**

IN

1831.

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PRELIMINARY NOTICE.

THE business of THE HIGHLAND SOCIETY OF SCOTLAND is conducted by a President, Four Vice-Presidents, Thirty Ordinary, and Ten Extraordinary Directors, a Treasurer, and Principal and Depute Secretaries, to which latter all communications are addressed. The Ordinary Directors are subdivided into Committees for the despatch of business, assisted occasionally by those Ordinary Members most conversant with the subjects to be discussed. The Report of each Committee is brought before the Directors collectively for farther procedure, and these proceedings are again submitted for approbation to a half-yearly General Meeting of the Society. New members are admitted at the General Meetings by ballot. They pay a small annual contribution of £1 : 3 : 6, or, in their option, and in full of all future claims, a life-subscription of Twelve Guineas. All Meetings of Directors, or Committees, are open; and at these, any member may attend and deliver his opinion on the subjects under consideration, though, in cases of division, the Directors or Members of the Committees only are entitled to vote. Members have access to the Society's Library, which is annually increasing, by the purchase or donation of books connected with the purposes of the institution.

When the Highland Society of Scotland was instituted in the year 1784, the object chiefly contemplated was the improvement of the Highlands—and hence the name which it assumed. But the great increase in the number of its Members since that time, the happy management of its funds, and the change in the general state of the country, have long enabled it to extend the design of its first institution, and direct attention to every part of North Britain where industry might be excited, or the useful arts improved.

The Society has, neither by its Charter of Incorporation, nor by its subsequent practice, been limited in its patronage to any one department of industry; but it has regarded, as the fitting objects of encouragement, every application of useful labour which might tend to the general good. But although its patronage be thus extended as regards its objects, circumstances have arisen to modify, in some cases, the application of it. The establishment of certain Boards, as for the encouragement of the Herring Fishery, and the like, has induced the Society to restrict its original views, and to devote its attention, and apply its funds, in a more especial manner to other objects, and chiefly to Agriculture and Rural Economy in their various branches.

In fulfilment of its purposes, the Society is every year accustomed to offer and award a variety of Premiums, as the means of eliciting and diffusing knowledge, as incitements to industry, or as the rewards for useful undertakings. These relate to every subject which may be supposed to fall within the plan of the Institution:—such are, the improvement of the Waste Lands of the country, by Tillage, by Irrigation, or by Draining,—the extension of Plantations, as the objects of ultimate profit, or of present embellishment and shelter,—the improve-

ment of the breeds of Live Stock, and of the qualities of Wool,—the encouragement of certain domestic Manufactures,—the invention of Useful Machines,—and, not the least in interest and importance, the awakening the Industry of the Lower Ranks to such pursuits as shall promote their content, by ameliorating their condition.

Although certain subjects be thus selected as the objects of experiment or discussion, the patronage of the Society is not restricted to these objects. Its purpose being the promotion of general industry and improvement, it receives with favour every beneficial communication, and every statement of facts, which may admit of an useful application. A Mechanical Department exists for rewarding the original invention or subsequent improvement of all machines and implements for Agricultural purposes, the construction of those for other branches of Rural Economy, and of some for domestic convenience. Models of these are received and preserved; and it is proposed, that, for the future, descriptions shall as speedily as possible be conveyed to the Public of all such as may merit attention.

The Transactions of the Society were formerly printed by volumes :—Six were published in that form, which may be had of Messrs CADELL and Co. of Edinburgh, successors to the interest held by Messrs CONSTABLE and Co. in the Copy-right, and by whom they will be furnished to Members at 25 per cent. under the selling price.

The papers of the Society now appear periodically in "THE QUARTERLY JOURNAL OF AGRICULTURE, AND THE PRIZE ESSAYS AND TRANSACTIONS OF THE HIGHLAND SOCIETY OF SCOTLAND," published by Mr BLACKWOOD of Edinburgh, Mr CADELL of London, and Messrs CURRY and Co. Dublin.

All Communications relating to Premiums, as well as Papers or Reports for publication in the Transactions of the Society, and other subjects for the consideration of the Directors, are to be addressed to CHARLES GORDON, Esq. Deputa-Secretary, at the Society's Hall, Albyn Place, Edinburgh.

NOTICE TO CANDIDATES, AND GENERAL REGULATIONS OF COMPETITION.

WHEN subjects are specially selected for competition, it is always to be understood, 1st, That, however concisely the subjects themselves be announced, ample information is required concerning them; 2^d, That this information shall be founded on experience or observation, and not on simple references and quotations from books; 3^d, That it shall be digested as methodically as possible; and, 4th, That Drawings, Specimens, or Models adapted to a defined scale, shall accompany Writings requiring them for illustration.

Certain conditions are annexed to each of the various subjects of competition, as detailed in the List of Premiums; and these are rigidly enforced by the Society, as the only means of ensuring regularity in the conduct of the business, and of distributing exact justice among the competitors.

In all Essays for competition, it is expected that when facts not generally known are stated, they are to be authenticated by proper references. Competitors in Essays shall not communicate their names, but shall transmit along with the Essays a sealed note containing their names and addresses, and inscribed on the back with some distinguishing motto or device, which shall also be inscribed on the Essay. When this regulation is neglected, such Essay shall not be received in competition. If the Essayist has formerly gained a Premium from the Society for a Paper communicated by him, it is recommended that his subsequent Essay shall be written in a different hand from that of the former successful Paper.

None of the sealed notes, except those which bear the distinguishing motto or device of the Essays found entitled to Premiums shall be opened, and the sealed note will not in any instance be opened, without consent of the author, unless a Premium equal to at least one-half of the sum offered shall have been adjudged: But should no application be made for the Paper on or before the 1st of March in each year, it will be held as belonging to the Society on the terms proposed. Such Essays as are not found entitled to any Premium shall, with the sealed notes, be returned to the authors, if required. The Society is to be at liberty to publish the Essays, or extracts from them, for which the Premium, or part of it, shall be awarded.

Candidates are requested to observe, that, in any instance, when Essays, Reports, or Certificates, are unsatisfactory, the Society is not bound to give the reward offered; and that in certain cases, power is reserved of giving such part only of a Premium as the claim may be adjudged to deserve; but competitors may feel assured that the Directors will always be inclined to judge liberally of their several claims.

In all Reports of Experiments relating to the Improvement or Management of Land, it is expected that the expenses shall be accurately detailed. When Machines or Models are transmitted, it must be stated whether they have been elsewhere exhibited or described.

In all Premiums offered, having reference to Weight or Measure, the New or Imperial Standards are alone to be understood as referred to; and should Competitors in any instance refer to other Weights or Measures, the exact proportion which these bear to the New Standards must be accurately specified, otherwise the claim will not be entertained.

When the Premiums are awarded in Plate, the Society will, in such cases as the Directors may see proper, allow them to be paid in Money, on the application of the successful Candidates.

OFFICERS AND DIRECTORS, 1881.

PRESIDENT,

HIS GRACE WALTER FRANCIS, DUKE OF BUCCLEUCH AND
QUEENSBERRY, K. T.

VICE-PRESIDENTS.

THE MOST NOBLE GEORGE, MARQUIS OF TWEEDDALE, K. T.
THE RIGHT HON. DAVID, EARL OF AIRLIE.
THE RIGHT HON. DAVID, EARL OF LEVEN AND MELVILLE.
THE RIGHT HON. JOHN, LORD VISCOUNT GLENORCHY.

GILBERT INNES, Esq. of Stow, Treasurer.

R. MACDONALD, Esq. of Staffa, Secretary.

CLAUD RUSSELL, Esq. Accountant, Auditor of Accounts.

MESSRS LEWIS and CHARLES GORDON, Deputé Secretaries
and Collectors.

The Very Reverend GEORGE H. BAIRD, D.D. Principal of
the University of Edinburgh, Chaplain.

MR JAMES MACKAY, Jeweller and Medallist.

MR CHARLES LAWSON, Nursery and Seedsman, and Curator
of Seeds and Plants.

MR WILLIAM DICK, Lecturer at the Veterinary School.

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According to priority in date of Election.

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Robert Clerk Rattray, Esq. younger
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Alexander Pringle, Esq. of Whyt-
bank, M.P.

Sir John Hope of Craighall, Bart.

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culture in the University of Edin.

Robert Graham, Esq. of Redgorton.

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John Stewart, Esq. of Belladrum and
Carnousie.

One Vacant.

*Those marked thus *, were elected at the last Anniversary Meeting.*

PREMIUMS, &c.

HIGHLAND SOCIETY HALL,
EDINBURGH, Feb. 9. 1831.

THE HIGHLAND SOCIETY OF SCOTLAND does hereby advertise, That the under-mentioned PREMIUMS are to be given by the Society in the year 1831, &c.

ESSAYS AND REPORTS.

1. THE CONSTRUCTION OF WHEEL-CARRIAGES EMPLOYED IN AGRICULTURE.

A Piece of Plate, of Twenty-five Sovereigns value, will be given for the best and approved Essay on the Construction of Wheel-Carriages employed in Agriculture, founded on experience.

In this Essay, the writer will be required to point out the defects in the construction of the Wheel-Carriages commonly used, and the means which have been most successfully employed for obviating these defects. His attention is in a particular manner required to be directed to the best construction and position of the wheels,—to the practical effects of dishing and bending the axle,—to the modes of fixing the spokes and fellies,—to the best method of making the carriage, with reference to the facility of loading and unloading,—to the kind and quality of the materials to be used,—and to such other circumstances as may direct the practical artizan in the construction of the Carriage. The Essay to be lodged by 20th October 1831.

2. COLLECTING AND PRESERVING THE SEEDS OF FOREST TREES.

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Essay (founded as much as possible on the writer's personal experience), on the subject of collecting and pre-

serving the Seeds of Forest Trees, suited to the climate of Scotland; the best mode of extracting the Seeds from the Cones of the Pine Tribe, and the mode of sowing the Seeds, and bringing forward the young Plants, until they are ready for planting out.

It is expected, that, in describing the manner of collecting cones and seeds, the proper season for gathering each kind will be pointed out, and the manner of removing them with least injury to the parent tree; also the degree of heat, as indicated by reference to Fahrenheit's thermometer, to which the cones may be subjected, without injury to the vegetative powers of the seed; and that the most easy and economical mode of extracting, cleaning, and preserving the various seeds, will be fully detailed, and the indications pointed out of the fitness of seeds for successful germination. The modes of sowing the different kinds of seeds, and the depth of earth by which they should be covered; the quantity of seed to be put on the square yard, or other given measure; the period and mode of transplanting into nursery lines, and the time during which each kind should remain in such lines; with other particulars necessary for showing the best means of bringing the seedlings to the state ready for being planted out, must be satisfactorily detailed.

It is expected, that where the writer does not find the information communicated on his own experience, he will refer to well-authenticated facts. Attention must be especially directed to the trees most valued for their economic uses; but it would be highly desirable also to obtain information regarding any of the rarer species which may seem suited to the climate of the country.

The following deciduous forest trees may be enumerated as claiming attention, and regarding which the author is invited to communicate his remarks, in so far as his experience and means of observation extend:—Oak, Ash, Wych or Scotch Elm, English Elm, Beech, Sycamore, Larch, Corsica Pine or Laricio, Sweet Chestnut, Birch, Walnut, Horse Chestnut, Alder, Mountain Ash or Roan, Hornbeam, White Thorn, Elder or Bourtree, Broad-leaved or Scots Laburnum, Swedish Maple, and White Beam. Among evergreen trees, may be mentioned Holly, Evergreen Oak, and some of the principal cone-bearing trees, such as the Scots Fir (best variety), Norway Spruce, Silver Fir, Pinaster, Weymouth Pine, Cedar of Lebanon, White American Spruce, &c. Some kinds of forest trees, which, in this country, are generally propagated by layers or cuttings, may also be noticed, as well deserving of attention, namely, Lime-tree, Poplars of different kinds (Lombardy, Black Italian, White Egyptian, Balsam, and Ontario), Willows of different kinds,

Tulip-tree, and Oriental and Occidental Plane. The Essay to be lodged by 20th October 1831.

3. FELLING TIMBER.

Fifteen Sovereigns, or a Piece of Plate of that value, will be given for the best and approved method, founded upon experiment satisfactorily established, of applying the Saw by Machinery, in cutting down Wood.

The facilities afforded in the manufacture of rough wood into staves and boards, by the adoption of the circular saw, lead the Society to hope that the instrument may be applied in felling young and full-grown trees; and they are therefore induced to propose a Premium, in order to direct attention to the matter. The means employed must be simple, economical, and effective. Reports, accompanied by a Model of the Instrument, to be lodged by 20th October 1831.

4. CONVERTING PEAT INTO FUEL BY COMPRESSION.

There being reason to believe that Peat, by compression, may be converted into Fuel, not only better calculated for domestic use than that prepared in the common manner, but adapted to various purposes in the arts,—a Premium of Twenty Sovereigns, or a piece of Plate of that value, will be given for the best account, founded upon experiment, of a simple and economical method of effecting the purpose required. Reports, with the necessary illustrative models or drawings, to be lodged by 20th October 1831.

5. IMPROVEMENTS IN THE DWELLINGS OF THE WORKING CLASSES.

There being reason to believe that the Domestic comforts of the Peasantry and the Working Classes may be much increased by the introduction of Improvements in heating and lighting their dwellings, and in cooking their food,—the Gold Medal, or Ten Sovereigns, will be given for the best account of any such improvement which may have been introduced in other quarters, and which experience may have proved to be suitable to the circumstances of the Working Classes. The Report to be lodged by 20th October 1831.

6. DISEASE OF "FOOT-ROT" IN SHEEP.

A Gold Medal, or Ten Sovereigns, will be given for the most correct account of well authenticated facts, relative to the Disease

in Sheep denominated the "Foot Rot," bearing upon the following points :—

The varieties of the disease,—what are its first symptoms,—and how far it affects the general health of the animal. The cause, so far as is supposed;—the reasons for assigning such cause as the actual one. Whether the disease is in any degree hereditary or contagious, and whether an animal having once had it, is more susceptible of a return. What is the precise seat of the disease, and in what season of the year is the animal most subject to be attacked. The preventives most usually adopted, and to what extent they have been successful. The cure, or the means successfully used in the treatment of the disease. What pastures or soils are most subject to the disease, and if any soil is exempt from it; and, in general, any information that may be of use in the investigation of the complaint. The Essay to be lodged on or before 20th October 1831.

7. ACCOUNT OF THE QUARRIES IN SCOTLAND.

A Piece of Plate, of Fifty Sovereigns value, will be given for the best account of the principal Quarries in Scotland, particularly those of Granite, Limestone (including Marble), Sandstone, and Slate, in so far as the writer's experience and means of information extend, detailing the mode and expense of working, the value of the saleable material raised, and the quantities by weight or measure, with any other particulars which may appear to be interesting, with relation to the public and private importance of such quarries, the means of disposing of their produce, and any improvement in the modes of working them.

From those who may not find themselves able to extend their inquiries to the general subject of quarries, as indicated above, accounts of individual sale quarries will be received, and honorary Medals awarded, if the communication shall be deemed of sufficient importance and interest. Reports to be lodged by 20th October 1832.

8. GRASSES SUITED TO PASTURAGE IN WINTER.

It being necessary, in certain situations, that a considerable part of the live stock of this country should be kept in the fields during winter, it is desirable to ascertain which of the cultivated or natural Grasses are best suited for pasture during that season. The Society therefore offers Ten Sovereigns, or a piece of Plate of that

value, for the best and approved Essay upon the subject, founded on observation or experience.

The writer is required to point out the Grasses and other pasture Plants which he has observed to bear the rigour of the season, and afford the most food during winter; and where he is unable to give the Botanical names of such plants, he is required to transmit specimens of them collected at the time of flowering, and to state the situation in which they are found, and the character of the soils to which they seem adapted. He is farther invited to state, in so far as his means of observation extend, the advantages or disadvantages of saving grass lands, previous to winter, for the purpose of affording a rougher pasturage during that season. The Essays to be lodged by 20th October 1832.

9. ACCOUNT OF SALT-MARSHES IN SCOTLAND.

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Description of Salt Marshes, or grounds affording pasturage at low water in bays or estuaries of the sea in Scotland, detailing the nature of the soil, plants growing or which might grow on such lands, capabilities of improvement, and other relative circumstances; with a statement of the probable extent of land of this description. It is required that the plants referred to shall be specified by their botanical names. The Essay to be lodged by 20th October 1832.

10. FINE-WOOLLED SHEEP.

Fine Wool being absolutely necessary for the manufacture of English Broad Cloth, and there being some reason to believe, that, by particular treatment, the finer woolled breeds of Sheep may be naturalized in Scotland, a Premium of Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved detail, founded upon authentic information or personal observation, of the mode of rearing, feeding, and managing the fine woolled breeds in those parts of the Continent of Europe, which most nearly resemble Scotland in climate, shelter, and herbage. Reports to be lodged by 20th October 1832.

11. ECONOMIZING FUEL AND LIGHTING IN PRIVATE DWELLINGS.

A Piece of Plate, of Fifteen Sovereigns value, will be given for the best and approved Essay on the best mode of economizing Fuel,

in private dwellings, by consuming the smoke or otherwise, and also of lighting such houses by a simple apparatus for making and supplying Gas. The Essay to be founded upon actual experience of a satisfactory nature, and to be lodged by 20th October 1832.

12. REARING POULTRY.

Fifteen Sovereigns, or a Piece of Plate of that value, will be given for the best account, founded upon experience, of the most approved breeds of the different species of Domestic Poultry, suited to the climate of this country,—comprehending a detail of the most economical modes of rearing, feeding, and fattening them, as well with a view to private use as for the market,—particularly the various kinds of food best adapted for the purpose—the age at which the several species attain maturity, and may be used with the greatest advantage—and the benefit to be derived from resorting to the ancient, although in this country now almost obsolete practice, of rearing Capons; also the best construction and description of Poultry Houses, with and without the application of artificial heat, and the most approved description of Poultry Yards, &c. The Essay to be lodged by 20th October 1832.

13. CURING MEAT.

The Society not being aware of the existence of any scientific account of the principles and practice of Curing Meat, and believing that an understanding of the principles would lead to an uniform and improved practice in all cases,—a Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Essay on Curing Meat, in which the principles of the art must be pointed out and illustrated by reference to the best known methods adopted in practice, and in which must be explained the modifications required according to particular circumstances. The Candidate will likewise be expected to communicate any improved chemical or mechanical means adapted to this end, with which he may be acquainted, or which he may himself devise.

The Candidate will have the option of receiving the above sum, or an Honorary Medal, and a sum not exceeding L. 15 to indemnify him for experiments. The Essay to be lodged by 20th October 1832.

14. REPORTS ON DAIRY MANAGEMENT IN HOLLAND.

The honorary Gold Medal, or Twenty Sovereigns, will be given

for the best Report on the General Management of Dairies in Holland, founded on personal observation.

The Report is required to detail the description of pasture and general treatment of the Cows ; the process of manufacture, whether of butter or cheese, or both ; and to furnish a description of the dairy utensils, and how kept and cleaned ; with an account of the milk and cheese houses, with reference to interior arrangement, position and ventilation, and such other circumstances as may appear useful and interesting. Reports to be lodged by 20th October 1832.

15. REPORTS ON DAIRY MANAGEMENT IN SCOTLAND.

To the person who shall, on or before the 20th of October in any year, transmit to the Society the best Report on the Management of a Dairy of not fewer than ten Cows, in any District in Scotland —The Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

The Report will detail the mode of management in the Dairy which forms the subject of the communication ; the description of pasture, and general treatment of the Cows ; whether Butter or Cheese forms the staple produce ; the process of manufacture, and how disposed of : if Cheese, the kind or kinds made ; description of the milk and cheese houses, and of the utensils ; with any other circumstances that may appear material.

16. REPORTS ON IMPROVED RURAL ECONOMY ABROAD.

The honorary Gold or Silver Medal of the Society will be given for the best accounts, founded on personal observation, of any useful practice or practices in rural or domestic economy adopted in other countries, which may seem fitted for being introduced with advantage into Great Britain.

For the most approved communication under this head, which shall be rendered on or before the 20th October in each year, the Society's honorary Gold Medal will be awarded ; and for all other communications in the same year, which shall be approved of, the Society's honorary Silver Medal.

However advanced the state of the useful arts may be considered in this kingdom, it is not to be doubted that there are many practices in use, both of domestic and rural economy, in other countries, and particularly in France, the Low Countries, and the North of Germany, highly deserving of attention or imitation, and which yet are

too apt to be disregarded or unnoticed by the traveller or casual resident. The purpose chiefly contemplated by the offer of the present premium is to induce gentlemen, who may visit other countries, to take notice of and record such particular practices as may seem calculated to benefit their own country, in the branches of the arts referred to; and it is proposed that the earliest opportunity shall, in all cases, be taken of communicating such details to the public.

17. HONORARY PREMIUM FOR AN ACCOUNT OF ANY DISTRICT IN SCOTLAND.

To the person who shall, on or before the 20th of October, in any year, furnish to the Society the best Account of any District in Scotland, with reference to the present state of Husbandry and the progress of rural and general improvement—the Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

In describing the present state of Husbandry in the district, the writer is required to advert to the general character of the soil and surface—to direct attention especially to the more recent improvements that have been made, or that may be in progress, in the modes of tillage, the breeds of stock, the state and management of roads, the progress of plantations, and the like; and generally to offer such suggestions as may admit of practical application regarding the future improvement of the district.

CONDITIONS OF COMPETITION.

The conditions of Competition for Essays and Reports will be found under the "Notice to Candidates," prefixed to the List of Premiums, page 7th, and to which Competitors are referred.

The Essays and Reports on Subjects 1, 2, 3, 5, and 6, are to be lodged at the Society's Hall, on or before the 20th of October next, 1831; those on Subjects 7, 8, 9, 10, 11, 12, 13, and 14, by 20th October 1832; and Reports on Subjects 15, 16, and 17, by the 20th of October in any year.

EXPERIMENTS AND IMPROVEMENTS.

CLASS I.

STRAW PLAIT MANUFACTURE.

1. RAISING STRAW FOR THE MANUFACTURE.

For the best specimen, in a bleached state, of Straw raised in Scotland, from the *Grano marzolino*, or kind of wheat cultivated in Tuscany for this purpose; or any other species of wheat affording a culm of equal fineness, pliancy, and toughness—Ten Sovereigns.

CONDITIONS.

The specimens to be put up in bundles of not less than two inches diameter; and to be lodged at the Society's Hall on or before the 10th November 1831, with a narrative of the circumstances of their growth and preservation, and certificates satisfactorily signed, of the facts therein detailed. It is expected that the specimens produced by each competitor shall have been selected from a crop grown to the extent of at least half an acre.

2. BLEACHING STRAW FOR PLAIT.

It having been now established by experiment, that Straw of a quality fit for plaiting can be raised in Scotland, but that there is a difficulty in procuring it of a proper colour, from the injury which it often receives from the uncertainty of the weather in the process of bleaching and drying,—the Society being therefore desirous to discover some process of bleaching it, independent of the weather, offers a premium of Fifteen Sovereigns for the cheapest and most effectual process by which that end can be attained, without injury to the material.

Reports, detailing the process of Bleaching, with specimens of the Straw so prepared, and satisfactory certificates of its quality, colour, and tenacity, when made into Plait, to be lodged at the Society's Hall by 10th November 1831.

CLASS II.

WASTE LANDS.

1. HONORARY PREMIUM FOR IMPROVEMENT OF LAND BY TILLAGE.

To the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory report of his having, within the period of five years immediately preceding the date of his communication, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than one hundred acres—The Gold Medal.

The Report may comprehend such general observations on the improvement of Waste Land as the writer's experience may have led him to make; but it is required to refer especially to the land reclaimed, (which, if not in one continuous tract, must be in fields of considerable extent), to the nature of the soil, the previous state of the ground, the obstacles opposed to its improvement, the mode of management adopted, the expense, and, in so far as can be ascertained, the produce and value of the subsequent crops; and the land must have borne one crop of grain, at least, previous to the year in which the Report is made. The Report must be accompanied by a certified measurement of the ground.

2. DRAINING MOSS AND BOG LAND.

DISTRICT.—*The County of Aberdeen.*

To the Person, in the County of Aberdeen, who shall, between 1st March 1829 and 1st October 1831, have executed, in an effectual manner, the greatest extent, not less than 6000 yards of Drain, in Moss or Bog Lands, and with a view to the amelioration of the climate, as well as to the improvement of the soil—A Piece of Plate of Twenty Sovereigns value.

For the next greatest extent as aforesaid, not less than 3000 yards—A Piece of Plate of Ten Sovereigns value.

Competitors will observe, that these Premiums being offered chiefly with a view to the amelioration of the climate, the Society understands them to apply, not to hill and pasture grounds, which may be improved by surface or sheep drains, but to those tracts of flow moss and bog lands, usually situated at a lower level, and frequently with nearly a flat surface; and that to entitle a proprietor to either of the Premiums, in preference to a tenant who shall have executed

the drainage chiefly at his own expense, the proprietor must have drained double the extent of the tenant.

The extent of surface drained must not be under forty acres for the first, and twenty acres for the second premium. It is required that the ground so drained shall be effectually cleared of stagnant water and superabundant moisture; and in as far as circumstances will admit, rendered fit for planting, -raising grain, or producing useful herbage for the pasturing of cattle and sheep.

Certificates in favour of Competitors, specifying the above particulars, to be subscribed by two Members of the Society, who shall have seen the state of the ground previous to, and at the conclusion of, the operations, accompanied with a particular account, verified by affidavit, respecting the extent and description of the drains executed, their general depth and width; the state of the ground previous to, at different stages, and conclusion of, the operations; the mode in which the same were executed; the expense—and, in the case of a tenant, what part thereof is allowed by the landlord; with any other circumstances connected with the subject, of which it may appear material that the Society should be informed. Certificates to be transmitted to the Secretary on or before the 10th November 1831.

CLASS III.

CROPS AND CULTURE.

1. NEW PLANTS ADAPTED TO FIELD-CULTURE.

To any Person who shall, on or before the 20th October in any year, report to the Society any new species or variety of useful Plant, adapted to the ordinary field culture of Scotland—The Silver Medal, or a Piece of Plate, as the Directors may see fit, in the circumstances of the case.

Satisfactory evidence will be required that the plant produced is new in the cultivation of the country, either as regards the species or variety, valuable as regards the uses to which it may be applied, and congenial to the soil and climate of Scotland. A particular detail of the discovery or circumstances which led to the experiment must be furnished, the mode of culture described, and a specimen of the plant transmitted.

2. FEEDING OFF TURNIPS BY SHEEP.

The Society being of opinion that the practice which obtains in some districts of England, and of the south of Scotland, of feeding off Turnips on the ground by sheep, may be advantageously intro-

duced into other districts, in certain soils and situations, offers the following premiums, in the districts after mentioned, viz.

1. *The Moulinearn, Dunkeld, and Blairgowrie Districts of Perthshire.*
2. *The District of Aberdeenshire and Kincardineshire, on both sides of the river Dee, comprehending the parishes of Nigg, Banchory-Devenich, Maryculter, Peterculter, Durris, Drum-oak, Upper Banchory, Strachan, Kincardine O'Neil, Lumphanan, and Aboyne.*
3. *The Stewartry of Kirkcudbright.*
4. *The Crief District of Perthshire, comprehending the parishes of Crief, Monyvairst, Strowan, Comrie, Monzie, Madderty, Trinity-Gask, and Fowls-Wester.*
5. *The Eastern District of Ross-shire.*

To the Farmer in each of the First, Second, and Third Districts, who, in the year 1830, shall have cultivated, in drill, the greatest extent of Turnips, not being under ten acres, in proportion to the extent of his land under the plough that year, and of which at least one-half shall be eaten off on the ground by the feeding of sheep, carefully and regularly enclosed with hurdles or nets, and upon land well adapted to the purpose—Ten Sovereigns.

To the Farmer in each of the said districts, who shall have cultivated and fed off the next greatest extent, as aforesaid, not being less than four acres—Five Sovereigns.

To the Farmer in each of the Fourth and Fifth Districts, who shall, in the year 1831, cultivate the greatest extent of Turnips, in drill, estimated as aforesaid, not being under ten acres, and of which at least one-half shall be eaten off on the ground, in manner before specified—Ten Sovereigns.

To the Farmer in each of the Fourth and Fifth Districts, who shall cultivate and feed off the next greatest extent, not less than four acres—Five Sovereigns.

In any portion of the field, reserved to be fed off by sheep, the blanks left by the turnips removed shall not exceed five drills, so as the benefit of this mode of feeding, arising from the treading and manure of the stock so fed, may be distributed over the whole of such portion.

Competitors for the Premiums in the 1st, 2d, and 3d Districts, will transmit to the Secretary of the Society, on or before 10th November 1831, an affidavit, specifying the extent of ground under the plough in 1830, the extent under turnips that year, the kind or kinds raised, the proportion fed off by sheep, the manner in which

it was done, and within what period ; description of sheep so fed, and whether they were the claimant's own stock, or were sent for feeding by another ; and, in the last case, the price obtained per acre will be stated. The affidavit to be accompanied by a certificate of two Members of this Society, in support of the matters therein detailed.

The like certificates, for the 4th and 5th Districts, to be transmitted by 10th November 1832.

3. CULTIVATION OF FIELD-BEET OR MANGEL-WORZEL.

A Gold Medal, or Piece of Plate of Ten Sovereigns value, will be given for the best and approved Account of an Experiment, or series of Experiments, on the Cultivation of Mangel Worzel, the best mode of storing and preserving the Root for use, and its application to the purposes of feeding Dairy Cows or other Live Stock.

In this experiment, the nature of the soil, and the kind and quality of manure employed, must be stated, and the period of sowing and general cultivation of the crop distinctly detailed. The extent reported to be cultivated in any single experiment must not be less than two acres ; but, for ascertaining the weight of produce, it will be sufficient to weigh the roots of such portion and so selected, as will give a fair average.

Competitors are invited to communicate their opinions, generally on the experience they have acquired, as to how far this plant seems suited to the climate and soil of Scotland, and in what respects and cases it may be used beneficially as a substitute for the root plants now in use.

Reports to be lodged with the Secretary by 10th November 1831.

4. EXPERIMENTS WITH SALTPETRE AS A MANURE.

For the best Essay or Report, founded on actual experiment, on the Effects of the application of Nitre or Saltpetre as a Manure or Top-dressing to land under crop, and the nature of its action on the same—A Gold Medal, or Ten Sovereigns.

It would be desirable to distinguish the experiments as made upon the different kinds of crop, such as Wheat, Barley, Oats, Peas, Clover and Rye Grass, Lucerne, Meadows and Pasture Ground. The extent not to be less than one acre, and a comparison made upon one acre more of the same field, using lime, soot, or other top-dressing—the quantities of each manure, period, mode of application, and expense, to be accurately detailed, and the apparent improvement, if any, by the nitre, certified on inspection by two Members of the Society. Reports to be lodged by 10th November 1831.

5. USE OF KELP AS A MANURE.

It being understood that Kelp has of late been applied with success to land, as a manure, the Society, desirous of bringing its properties fully before the public, hereby offers the following premiums :

1. For the best Report, founded on experiment, on the application of Kelp as a top-dressing to land under hay or pasture, as compared with a similar application of lime, dung, or other manure, to land under hay or pasture—Ten Sovereigns, or a Piece of Plate of that value.

2. For the best Report, founded on experiment, on the application of Kelp as a manure, to land under white corn or bean crops, as compared with the application of lime, dung, or any other manure, to land under similar crops—Ten Sovereigns, or a Piece of Plate of that value.

3. For the best Report, founded on experiment, on the application of Kelp as a manure, to land under turnips or potatoes, as compared with the application of lime, dung, or other manure, to land under similar crops—Ten Sovereigns, or a Piece of Plate of that value.

CONDITIONS.

1. The extent of land to which the kelp is applied in the experiment must not be less in any case than three acres, and the extent of land dressed with the other manures to be compared with the kelp, must in like manner be not less than three acres.

2. The Report must specify the quantity of kelp and of the other manures employed ; the expense per acre of the kelp and the other manures respectively ; the time and mode of application ; the quantity and value of the produce, and such other particulars as may be necessary to determine the relative value of kelp as compared with other manures. Should the experimenter wish to make a trial with the kelp in combination with other manures, he is invited to do so, but this must be on land exclusive of that to be allotted to the kelp as above.

Reports must be lodged with the Secretary at the Society's Hall, by 31st December 1831.

6. CULTIVATION OF LAND BY MANUAL LABOUR.

It having been supposed, that, under certain circumstances, the Spade may be advantageously substituted for the Plough, for the cultivation of particular crops,—the Society, in order to obtain practical and satisfactory information on this subject, offers the following Premiums :—

Twenty Sovereigns, or a Piece of Plate of that value, will be given to the tenant or occupier of land in Scotland who shall cultivate with the Spade the greatest extent, not under six acres, of

field land, during the years 1831 or 1832, such land having been formerly under tillage.

For the second greatest extent, as aforesaid, not under four acres—Ten Sovereigns.

CONDITIONS.

The reports must specify the extent of land cultivated ; the number of labourers employed, and the period for which they were employed, with a detailed statement of the whole expense incurred ; the kind and quantity of manure employed ; the depth to which the land had been dug or trenched ; the amount, weight, and value of the produce, and any other information that may be considered useful. Reports to be lodged with the Secretary by 20th December 1832 ; accompanied by a certified measurement of the ground, and by certificates of two members of the Society, in support of the several matters therein detailed.

7. PLOUGHING COMPETITIONS.

Premiums to ploughmen for improvement in ploughing, having for some years been given very generally over the country by the resident gentlemen, and local Agricultural Societies, the Highland Society has, in the mean time, discontinued them ; but being desirous of encouraging improvement in this branch of husbandry, the Society will give its Silver Plough-Medal to the ploughman found to be the best at such competition, provided not fewer than fifteen ploughs shall have started. The Medal will be issued upon a report from one or more Members of the Society, who shall have actually attended the competition, stating the number of ploughs that had started, and that the ploughman found to be the best had not received the Society's Medal at a previous competition in the same district.

The reports must be lodged with the Secretary, at the Society's Hall, within three months after the competition, otherwise the Medal will not be issued.

CLASS IV.

PASTURES.

1. LAYING DOWN LANDS TO PERMANENT PASTURE.

The Gold Medal, or a Piece of Plate, will be given to the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November, in any year, report to the Society the most successful experiment in the laying down of land to permanent pasture, either wholly with the indigenous grasses, or with a mixture of these grasses and the clover, or other plants adapted for herbage.

The land which has formed the subject of experiment must have been pastured for at least one season, exclusive of that in which the Report is given in ; the extent of the ground must not have been less than ten acres ; and a certified account must be transmitted of the kinds and quantity of the grass seeds sown.

In offering this Premium, the Society does not express any opinion regarding the expediency of keeping land in a state of permanent grass, rather than in a course of alternate tillage, nor regarding the supposed superiority of several of the native grasses for the purpose of pasture, over the artificial grasses so long and beneficially employed in Scottish Agriculture. The Society merely proposes to obtain information and promote experiment, and to direct attention to a branch of rural economy supposed to have been hitherto less attended to, and less successfully practised in Scotland, than the alternate husbandry.

The Reporter, while he is required to state the results of the experiment to which his own report refers, is invited to communicate such farther information as his experience enables him to give, regarding the general management of land in a state of perennial pasturage, the means which may be employed for maintaining or increasing the productiveness of the herbage by top-dressing or otherwise, and the modes which have been found most successful in practice for destroying mosses and other injurious plants in the sward.

2. COMPARATIVE ADVANTAGES OF LAYING DOWN LANDS TO PASTURE, WITH AND WITHOUT A WHITE CROP.

There being reason to believe that the sacrifice of a white crop, in laying down lands to pasture, will, under many circumstances, be counterbalanced by the superior produce of grass, the Society is induced to offer the following premium :—

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved comparative Report, founded upon actual experience in Scotland, of land laid down to pasture with the Indigenous Grasses adapted to the particular soil, without any white crop, along with the Grass Seeds ; and of land in similar circumstances of soil, climate, and condition, sown down with the same grasses along with a white crop.

The extent of land in each experiment not to be less than seven acres ; and a particular statement is required of the kinds and quantities of the grass seeds used, with a distinct account of the kind and number of stock pastured upon each field, with their comparative progress in condition, for three successive seasons. The sort of grain sown as white crop must be likewise reported. A hay crop is of course excluded.—Reports to be lodged by the 10th November 1832.

CLASS V.

LIVE STOCK—DISTRICT COMPETITIONS.

§ I. CATTLE.

PREMIUMS FOR IMPROVING THE BREED OF CATTLE IN THE FOLLOWING DISTRICTS :—

1. *The Eastern District of Forfarshire, comprehending the parishes of Montrose, Menmure, part of Edzell, Carriston, Oathlaw, Arbroath, Lunan, Guthrie, Kinnell, Monifieth, Maryton, Brechin, Lethnot, Lochlee, Craig, Aberlemno, Carmylie, Panbride, Rescobie, Inverkeillor, Monikie, Farnwell, Fearn, Stricathro, Dun, Logie-Pert, Tannadice, Barrie, Kirkden, St Vigeans, and Arbirlot.*
2. *The Districts of Morven, Ardnamurchan, Sunart, and Kingerloch, in the county of Argyll.*
3. *The Districts of Moidart, Arisaig, and Knoidart, including the islands of Eig, Rum, and Canna, in the counties of Inverness and Argyll.*
4. *The Islands of Shetland.*
5. *The West Teviotdale District in the counties of Roxburgh and Selkirk, comprehending the parishes of Hobkirk, Kirkton, Cavers, Hawick, Roberton, Wilton, Southdean, Minto, and Lilliesleaf.*
6. *Kinross-shire.*
7. *The District of Dumbartonshire west of the River Leven, comprehending the parishes of Arrochar, Luss, Roseneath, Row, Cardross; and that part of the parish of Bonhill on the right bank of the River Leven.*
8. *The parishes of Greenock, Port-Glasgow, Kilmacolm, Largs, and Innerkip, in the counties of Renfrew and Ayr.*
9. *The Island of Mull, Argyllshire, including the Islands of Coll, Tyree, Ulva, Icolmkill, and other small isles adjacent.*
10. *The District in the west of Perthshire, comprehending the parishes of Callander, Kilmadock, Kincardine, Comrie, and Balquhadder, with that part of the District of Breadalbane comprising Glenlochry, Glendochar, and Glenfalloch.*
11. *Wigtonshire.*
12. *The Island of Arran.*

13. *The Districts of Mid and Nether Lorne, in the county of Argyll, comprehending the parishes specified in the List of Premiums of last year.*
14. *Clackmannanshire, including the parishes of Culross, Fossaway, Tulliallan, Muckhart, Logie, and Glendevon, in the county of Perth, and Alva, in Stirlingshire.*
15. *The following parishes in the counties of Stirling, Dumbarton, and Perth, viz. Drymen, Buchanan, Balfron, Gargunnoch, St Ninian's, Kippen, Baldernock, Killearn, Strathblane, Fintry, Kilmaronock, East and West Kilpatrick, that part of Bonhill to the east of the Leven, Dumbarton, Aberfoyle, and Port.*
16. *The District of Kincardineshire, comprehending the parishes of Fettercairn, Fordun, Marykirk, Garvock, Laurencekirk, Arbuthnot, Glenbervie, and that part of the parish of Edzell in Kincardineshire.*
17. *The District of Aberdeenshire, comprehending the parishes of Strathdon, Glenbucket, Cabrach, Towie, Tarland and Migvic, Logie-Coldstone; those parts of the parishes of Coul and Tulloch in Cromar; those parts of the parishes of Glenmuick, Glengairn, and Tullich, and of Crathie, which are on Gairenside and in Morven.*
18. *The District of Buchan, in Aberdeenshire, from the River Ythan on the south, to the River Doveran on the north and west, including also the adjoining parishes of Logie-Buchan, Foveran, and Methlick, in the District of Fomartin.*
19. *The District of Huntly, comprehending the following parishes in the counties of Aberdeen and Banff, viz. Huntly, Cairnie, Gartly, Rhynie, Auchindoir and Keorn, Kildrummie, Clatt, Kinnethmont, Carbach, Glass, Mortlach to the north and east of the Rivers Fiddich and Dullan, Boharm, Botriphnie, Drumblade, and Forgue.*

For the best Bull, from two to seven years old, *bona fide* the property, and in possession, of any proprietor or tenant in each of the eleven Districts, Nos. 1, 5, 6, 8, 11, 14, 15, 16, 17, 18, and 19, as above described, kept on his farm within the District, from the 20th day of May preceding the day of competition—Ten Sovereigns.

For the second best Bull, of the age above specified, *bona fide* the property, and in possession, of any proprietor or tenant in each of the said eleven Districts, and kept on his farm, within the District, for the aforesaid period—Five Sovereigns.

For the best Bull, of the age above specified, *bona fide* the property, and in possession, of any tenant in *each* of the eight Districts, Nos. 2, 3, 4, 7, 9, 10, 12, and 13, kept on his farm, within the District, from the 20th day of May preceding the competition—Ten Sovereigns.

For the second best Bull, of the same age, in *each* of the said eight last mentioned Districts, the property, and in possession, of any tenant, and kept on his farm, within the District, for the fore-said period—Five Sovereigns.

For the best *two* Queys, of two years old, the property of, and bred by, any tenant in each of the nineteen Districts above mentioned (Shetland, No. 4, and Kinross, No. 6, excepted)—Five Sovereigns.

For the second best *two* Queys, of two years old, the property of, and bred by, any tenant in each of the nineteen Districts above mentioned (Shetland, No. 4, and Kinross, No. 6, excepted)—Three Sovereigns.

For the best Quey, of two years old, the property of, and bred by, any tenant in the Shetland District, No. 4—Five Sovereigns.

For the second best Quey, of two years old, the property of, and bred by, any tenant in Shetland—Three Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor of land under L. 300 of yearly rent or value, in the Kinross District, No. 6.—Five Sovereigns.

For the second best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor, as aforesaid, in Kinross-shire—Three Sovereigns.

The Premiums in the 2d, 3d, 9th, 12th, and 13th Districts, are limited to the West Highland breed; in No. 8, to the Ayrshire dairy-breed; in No. 11, for the Galloway breed, and for *Bulls* shown in the 5th, to the Short-horn breed. The competition in the Districts Nos. 1. to 10, both inclusive, will take place in 1831. In Nos. 11. to 18, both inclusive; the first and second competitions under the system of alternate years having been held in 1828 and 1830, the third competition will be in 1832. The first competition for No. 19. having been in 1830, the second will be in 1832. In the intermediate years, such premiums only as shall be given by the gentlemen of the respective Districts, or by local associations therein, are to be competed for.

The following Members of the Society (as Members only, or their Factors in their absence, can be named) are hereby appointed Judges for the ten Districts first above mentioned. In the nine last

mentioned Districts, the Judges were named in the advertisement of 1830.

FOR THE FIRST DISTRICT.—The Earl of Airlie; the Honourable W. Maule of Panmure, M.P.; Lord Gillies; the Honourable D. Ogilvy; the Honourable W. Ogilvy; Sir John Ogilvy of Inverquhar, Bart.; Sir James Ramsay of Bamff, Bart.; David Blair, Esq. of Cookston; David Blair, Esq. younger of Cookston; David Carnegie, Esq. of Craigo; James Carnegie Arbuthnot, Esq. of Balmamoon; W. Fullarton Lindsay Carnegie, Esq. of Boysack; Thomas Drummond, Esq. younger of Newton; Robert Douglas, Esq. of Bridgeton; Alexander Greenhill, Esq. of Fearn; James W. Hawkins, Esq. advocate; David Hunter, Esq. of Blackness; James L'Amy, Esq. of Dunkenny; George Lyon, Esq. of Glenogil; Gilbert Laing Meason, Esq. of Lindertis; John Ochterlony, Esq. of Gwynd; John Pattullo, Esq. of Longhaugh; George Robertson Scott, Esq. of Hedderwick; Captain Robert Scott of Abethune; Robert Spied, Esq. of Ardovie; Henry Stephens, Esq. Balmadies; P. Wedderburn, Esq. of Newgrange; Mr Crow, Kincairg; and any other Members residing in the District; five a quorum. The Honourable William Maule, M.P. Convener.

FOR THE SECOND DISTRICT.—Sir James M. Riddell, Bart.; R. G. Macdonald, Esq. of Clanranald; Colonel Robertson Macdonald of Kinlochmoidart; Hugh Maclean, Esq. younger of Coll; Campbell D. Riddell, Esq.; William Robertson, Esq. younger of Kinlochmoidart; John Gregorson, Esq. of Ardtornish; Angus Macdonald, Esq. of Glenaladale; and any other Members in the District; two a quorum. Sir J. M. Riddell, Bart. Convener.

FOR THE THIRD DISTRICT.—Sir Duncan Cameron of Fassfern, Bart.; R. G. Macdonald, Esq. of Clanranald; Angus Macdonald, Esq. of Glenaladale; Colonel Robertson Macdonald of Kinlochmoidart; William Robertson, Esq. younger of Kinlochmoidart; Captain Gordon Cameron of Letterfinlay; Alexander Macdonald, Esq. of Rhue; Dr Maclean at Rum; and Mr Chisholm at Irin; three a quorum.—Mr Macdonald of Glenaladale to be Convener.

FOR THE FOURTH DISTRICT.—Lord Dundas; Sir Arthur Nicholson, Bart.; William Mowat, Esq. of Garth; Robert Bruce, Esq. of Symbister; John Bruce, Esq. younger of Symburgh; Robert Hoseason, Esq. of Mossbank; and any other Members in the District; two a quorum.—Mr Mowat of Garth, Convener.

FOR THE FIFTH DISTRICT.—His Grace the Duke of Buccleuch; the Earl of Minto; Sir Edmund Antrobus, Bart.; Sir William Scott of Ancrum, Bart.; Sir W. F. Elliott of Stobs and Wells, Bart.; William Elliot Lockhart, Esq. of Cleghorn; James Johnstone, Esq. Alva; John C. Scott, Esq. of Synton; James Elliot, Esq. of Wolfie; Lieutenant-Colonel James Fergusson of Huntlyburn; George Cleghorn, Esq. of e; ns; Archibald Dickson, Esq. of Huntlaw; Archibald Jerdan, Esq.

of Bonjedward; John Robertson, Esq. Edrom House; H. F. Scott, Esq. younger of Harden, M.P.; Mark Sprott, Esq. of Riddell; Charles B. Scott, Esq. of Woll; John Pringle, Esq. of Clifton; Thomas Stavert, Esq. of Hosecoat; Archibald Douglas, Esq. of Adderstone; and any other Members in the District; three a quorum.—The Duke of Buccleuch, in his Grace's absence Mr Elliot of Wolfie, to be Convener.

FOR THE SIXTH DISTRICT.—The Lord Chief Commissioner; Lord Moncreiff; Admiral Adam; Thomas Bruce, Esq. of Arnot; Thomas Beatson, Esq. of Mawhill; the Rev. George Craig Buchanan of Mackeanston; John Wright Williamson, Esq.; and any other Members in the District; two a quorum.—Admiral Adam, Convener.

FOR THE SEVENTH DISTRICT.—Lord John Campbell; Sir James Colquhoun, Bart.; James Colquhoun, Esq. younger of Luss; R. C. Bontine, Esq. of Ardoch; J. C. Colquhoun, Esq. Sheriff of the County; James Dennistoun, Esq. of Dennistoun; James Dennistoun, Esq. younger of Dennistoun; Alexander Dunlop, Esq. advocate; John Horrocks, Esq. of Tillechewen Castle; J. R. Smollett, Esq. of Bonhill; Alexander Smollett, Esq. younger of Bonhill; James Smith, Esq. of Jordanhill.—Sir James Colquhoun, in his absence Mr Smollett, younger of Bonhill, Convener.

FOR THE EIGHTH DISTRICT.—The Earl of Glasgow; Lieutenant-General Sir Thomas Brisbane, Bart.; Sir Michael Shaw Stewart, Bart. M. P.; Lieutenant-General Darrock, of Gourack; J. C. Dunlop, Esq. Sheriff of Renfrewshire; R. Wallace, Esq. of Kelly; R. Cunninghame Bontine, Esq. of Ardoch; James Hunter, Esq. of Hafton; Claud Marshall, Esq. Sheriff Substitute of Greenock; John Campbell, Esq. of Craignure; William MacFie, Esq. of Langhouse; John Scott, Esq. of Hawkhill; John Scott, Esq. younger of do.; Roger Ayton, Esq. banker, Greenock; W. Macknight Crawford, Esq. of Cartsburn; Alexander Thomson, Esq. and J. H. Robertson, Esq. bankers, Greenock; James Watt, Esq. of Crawforddyke; James Stewart, Esq.; William Johnstone, Esq.; Robert Ewing, Esq.; Robert Sinclair, Esq.; James Mure, Esq.; Andrew Mure, Esq.; John Farrie, Esq.; James Leitch, Esq.; John Maclellan, Esq.; Maitland Young, Esq.; Charles Scott, Esq.; Adam Macleish, Esq.; John Gray, Esq. all merchants in Greenock; William Turner, Esq. surgeon, Greenock; and any other members in the district; five a quorum.—Mr Wallace of Kelly, in his absence Mr Marshall, to be Convener.

FOR THE NINTH DISTRICT.—Colonel Maclean of Coll; Hugh Maclean, Esq. younger of Coll; Lieutenant-Colonel Campbell, of Knock; Lieutenant-Colonel Campbell, of Possil; John Gregorson, Esq. of Ardtornish; Lieutenant-Colonel Robert Macdonald, Inch Kenneth; Lieutenant-Colonel Macquarrie, of Ulva; Murdoch MacLaine, Esq. of Lochbuy; Donald Maclean, Esq. of Borreray; John Maclean, Esq. of Killundin; John Stewart, Esq. of Auchadashinaig; Donald Maclean, Esq. W. S.; James Maxwell, Esq.; and any other members in the district; three a quorum.—Colonel Campbell, of Possil, to be Convener.

FOR THE TENTH DISTRICT.—The Earl of Breadalbane; the Earl of Moray; Viscount Glenorchy; Lord Willoughby de Eresby; Sir Evan Macgregor, Bart.; Sir Robert Dundas, Bart.; Alexander Buchanan, Esq. of Arnprior; R. Cunningham Bontine, Esq. of Ardoch; H. Home Drummond, Esq. M. P.; David Dundas, Esq. younger of Dunira; General Graham Stirling of Duchray and Achyle; John Burn Murdoch, Esq. of Gartincaber; William Stewart, Esq. of Ardvorlich; Robert Stewart, Esq. younger of do.; Captain Duncan Stewart, of Glenbuckie; John Lorn Stewart, Esq. younger of do.; James Graham, Esq. of Leitchtown; Donald Macdonald, Esq. of Craighuie; and any other members in the district; three a quorum.—General Graham Stirling, in his absence Mr Stewart, younger of Ardvorlich, to be Convener.

For the Eleventh, Twelfth, Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, and Nineteenth Districts, the Judges and Conveners remain as intimated last year, with the addition of those resident Members who have been since elected.

RULES OF COMPETITION.

1. The Conveners, with the approbation of a quorum of the Judges for conducting the several competitions, are respectively authorised, in such cases as they shall see proper, to divide the two premiums allowed for bulls, into three premiums, in such proportions as they shall approve, the first premium for bulls not being less than Eight Sovereigns, and, in like manner, to divide the sums allowed for queys into three premiums, fixing their amount. In Shetland, the Judges are empowered to divide the premiums for bulls into four, the first not being under Six Sovereigns, and for queys also into four, the first not being under Three Sovereigns.

2. The Judges shall not place for competition any stock which, in their opinion, does not fall within the regulations prescribed, or does not possess merit, and in no instance shall any of the premiums be awarded, where there are not, after such selection, at least three competitors, reserving to the Judges, in the case here provided for, to make such allowance to a party, showing stock of merit, not exceeding half the amount of the premium, as, under the circumstances, they may think reasonable.

3. The times and also the places of competition are to be fixed by the Conveners, with the advice of at least a quorum of their respective Committees, and the competitions are to take place between the 20th July and the 1st day of November next.

4. The Convener of each Committee will give timely notice to the other Judges of the district, of the place and time of the competition, and will be particularly careful, that the same be intimated at the several parish-church doors within the district for at least two successive Sundays previous to the competition.

5. As these premiums were given, in some of the above-mentioned districts, in 1827, 1828, 1829, and also in 1830, it is to be observed, that the Society does not admit an animal, in any class of stock, which may have gained a first premium at a district show, in a former year, to be again shown in competition in any district; and for no description of stock shall either the same or a lower denomination of premium be awarded, in the district in which they have already gained such premium.

6. No Member of the Committee, showing stock of his own at the competition, shall act as Judge, nor shall Factors, when they are Members of the Society, and are named Judges, or when acting as such in the absence of proprietors, compete for premiums in the District, in which they are Judges, in those Districts and classes, in which proprietors are excluded from competition. In all cases, it is expected, that the bulls, for which premiums are awarded, shall not be limited to serve the stock of the owner. The same person is not to obtain more than one of the premiums for bulls, nor more than one of the premiums for queys, in one year.

7. In order to entitle the competitors to their respective premiums, a regular report, signed by the Convener, and at least a majority of the Judges who attend the competition, must be transmitted by the Conveners, so as to be received by the Secretary on or before the 10th of December next, and which report must specify the ages of the Bulls and Queys preferred; the length of time the Bulls have been in the possession of the competitors; and, with respect to the Queys, that they were bred by the competitors, and were their property, on the day of competition; the number of Bulls and Queys respectively produced thereat; the number placed for competition; the names and designations of the persons to whom the premiums have been adjudged; amount of premiums voted to each; and, in general, that all the rules of competition fixed by the Society, as above mentioned, have been strictly observed; and, in particular, that the previous intimations to the Judges, and advertisements at the church doors, were regularly made as required. In case all the Judges who may have attended shall not have subscribed the report, the Convener will mention the cause which may have prevented their doing so.

Farther, it is to be distinctly understood, that in no instance does any claim lie against the Society for expenses attending a show of stock, beyond the amount of the premiums offered.

With reference to the competitions in the 2d, 3d, 9th, 12th and 13th Districts, the reports must bear, that the Bulls and Queys preferred were of the West Highland breed; in the 8th, of the Ayrshire dairy breed; in the 11th, of the Galloway breed; and in the 5th, that the Bulls were of the pure short-horned breed.

Conveners are requested to get the reports drawn up and signed by a majority of the Judges present at the competition before they separate.

NOTE.—The Society, being impressed with the benefit to be derived from continuing these competitions in the same districts for a longer period than had formerly been the practice, proposes to offer them in the districts Nos. 8, 9, and 10 (in which the present is the first year's competition of the series), for the years 1833 and 1835, and, provided the gentlemen of the district, or any local association therein, shall continue the competition and award premiums in the district, to the amount of not less than one half of the Society's premiums, and for the same description of stock, during the intermediate years 1832 and 1834, the Society will continue its premiums to the district in the year 1836. The same provisional continuance for the year 1832 was intimated in 1827, with reference to the districts Nos. 1, 2, 3, and 4, in which 1827 was the first year of competition; a similar intimation of provisional continuance for 1833 was made in 1828 for the districts Nos. 11 to 13, both inclusive, in which 1828 was the first year of competition—for 1834, for the districts Nos. 5, 6, and 7, in which 1829 was the first year of competition; and the like provisional continuance for 1835 was made last year for No. 19, in which 1830 was the first year of competition. A certificate of the competition and premiums awarded at the two intermediate local shows, signed by at least two members of the Society, must be transmitted to the Secretary of the Society, so as to be received by him on or before the 10th December in each year, in order to entitle the districts to any claim for the additional year's premiums.

§ II. SHEEP AND WOOL.

1. PREMIUMS FOR IMPROVING THE BREED OF SHEEP IN THE FOLLOWING DISTRICTS:—

1. *The District of Cowal, Argyleshire.*
2. *The following Parishes in the Counties of Mid-Lothian, Selkirk; Roxburgh, Peebles, and Dumfries, viz. Stow, Galashiels, Selkirk, Ettrick; Yarrow, Robertson, Ashkirk, Hawick, Melrose, Cavers, Eskdale Muir, Manor, Tweedsmuir, Lyne and Megget, Traquair, Innerleithen, and Peebles.*
3. *The Parishes of Assynt, Tongue, Duriness, and Edderachillies, including the Grazings of Invercashly and Shiness, in the County of Sutherland.*
4. *The Parishes of Applecross, Lochcarron, Lochalsh, Kintail, Glenshiel and Glenelg, in the Counties of Ross and Inverness.*
5. *Countries of Glengarry, Abertarf, Stratherrick, and the Parish of Urquhart in Inverness-shire, including the lands of Aberchaldier and Dumnaglass, partly in Nairnshire.*
6. *The Isle of Skye, in Inverness-shire.*
7. *The District of Forfarshire, called the Braes of Angus.*

For the best Pen of eighteen Gimmers or Ewes of the Black-faced breed, from sixteen to twenty months old, the property of any tenant within the First and Fourth Districts, and which shall be certified at the respective competitions to have been at least one year in his possession, and to have been, during that year, grazed on the same kind of pasture with the remainder of the flock of like age—Ten Sovereigns.

For the second best Pen, as aforesaid—Seven Sovereigns.

For the third best Pen, as aforesaid—Three Sovereigns.

For the best Pen of fifteen Cheviot Gimmers, in the Second District, bred upon moist grassy lands, according to the division of farms made by the Pastoral Society of Selkirkshire—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

For the best Pen of fifteen Cheviot Gimmers, or One-year-old Ewes, the property of any grazier within the Third District, and which shall be certified at the competition in August or September 1831, to have been at least twelve months in his possession—Ten Sovereigns.

For the second best Pen, certified as aforesaid—Five Sovereigns.

For the third best Pen, certified as aforesaid—Three Sovereigns.

The Premiums in the first and second districts were offered for the first year in 1827, and the districts having awarded Premiums in the intermediate years 1828 and 1830, those for the additional year held out by the Society, will be offered in 1832. In the third district the first year's competition was 1829, and the Society's Premiums will be again offered in 1833, and provisionally also in 1834. In the fourth district the present is the first year's competition, and the Society's Premiums will be continued for the years 1833 and 1835, and provisionally also for 1836, if the resident gentlemen or local associations, shall award Premiums in 1832 and 1833. Premiums were given by the Society, in 1828 and 1830, in the fifth and sixth districts. They will be again given in these districts in 1832, and their continuance for an additional year will, of course, be dependent on the circumstance of the resident gentlemen or local associations having awarded Premiums in the two intermediate years, 1829 and 1831. In the seventh district, the Premiums given in 1830 will be renewed in 1832 and 1834; and provisionally also for an additional year, if they shall have been continued in the district during the intermediate years 1831 and 1833.

The following Members of the Society are appointed Judges for awarding Sheep Premiums in the four first Districts:—

FOR THE FIRST DISTRICT.—Kirkman Findlay, Esq. of Castle Toward; Robert Maclachlan, Esq. of Maclachlan; Mungo N. Campbell, Esq. of St Catherines; Archibald Campbell, Esq. of Drimsynie; John Campbell, Esq. of Southall; James Finlay, Esq. younger of Castle Toward; Alexander Lamont, Esq. of Knockdow; James Ewing, Esq. of Dunoon Castle; Angus Fletcher, Esq. of Dunans; Archibald Campbell, Esq. of Glendaruel; John Campbell, Esq. of Strachur; George Wilson, Esq. of Innisnaruis; James Hunter, Esq. of Halfon; John Fletcher, Esq. of Bernice; James Lamont, Esq.; Mr Macfarlane, Strachurmore, and any other members in the district, five a quorum. Drimsynie and Maclachlan, or either of them—in their absence, Mr Lamont of Knockdow—to be Conveners.

FOR THE SECOND DISTRICT.—The Duke of Buccleuch; the Earl of Traquair; Lord Napier; Lord Montagu; William Allan, Esq. of Glen, Lord Provost of Edinburgh; Sir Thomas Gibson Carmichael, Bart.; Sir John Hay, Bart.; Sir Walter Scott, Bart.; W. Elliot Lockhart, Esq. of Borthwickbrae; Gilbert Innes, Esq. of Stow; R. N. Campbell, Esq. of Kailzie; James Pringle, Esq. of Torwoodlee; John Boyd, Esq. of Broadmeadows; John C. Scott, Esq. of Synton; John Pringle, Esq. of Clifton; Captain James Pringle, younger of Torwoodlee; John Borthwick, Esq. of Crookston; Alexander Pringle, Esq. of Whytbank, M. P.; Mark Sprott, Esq. of Riddell; Lieutenant-Colonel J. Fergusson of Huntlyburn; William Ogilvie, Esq. of Chesters; Thomas Macmillan, Esq. of Shorthope; Charles B. Scott, Esq. of Woll; Archibald Douglas, Esq. of Adderstone; Thomas Bruce, Esq. of Langlee; Thomas Staver, Esq. of Hosecoat, and any other members in the district: five a quorum. Lord Napier, in his absence Mr Pringle, M. P. to be Convener.

FOR THE THIRD DISTRICT.—The Marquis of Stafford; Earl Gower; Lord Francis Leveson Gower, M. P.; Lord Reay; George Dempster, Esq. of Skibo; Kenneth Mackay, Esq. of Torboll; Dugald Gilchrist, Esq. of Ospisdale; Hugh Lumsden, Esq. Sheriff of the county; Thomas Houston, Esq. of Creich; George Gunn, Esq. Rhives; Gabriel Reed, Esq. Gordonbush; John Horsburgh, Esq. Tongue House; J. Brander, Esq. Golspie; Angus Leslie, Esq. Princinian; Dugald Simpson, Esq. Helmsdale; and any other members in the district: three a quorum. Earl Gower, in his Lordship's absence, the Factors in the District—to be Conveners.

FOR THE FOURTH DISTRICT.—Sir Hugh Innes, of Lochalsh, Bart.; the Right Honourable Charles Grant, of Glenelg, M. P.; J. A. Stewart Mackenzie, Esq. of Seaforth; Thomas Mackenzie, Esq. of Applecross; David Dick, Esq. of Glensheal; A. K. Mackinnon, Esq. of Skalisai, and any other members resident in the district: two a quorum—Sir Hugh Innes, Bart. and Mr Mackenzie, of Applecross,—or either of them, to be Convener.

RULES OF COMPETITION.

The competition for the Premiums in the four first Districts will take place on such days, between the 20th of July and 1st November 1831, as shall be fixed by the Conveners, with the advice of a quorum of their respective Committees; and the Conveners of the first, second, and fourth Districts, are hereby empowered, with the same advice, to fix the places of competition for these districts. The Judges, in deciding the Premiums for Sheep, will have regard both to the wool and carcass of the animal. The regulations for Cattle Shows, in regard to fixing the competition—the previous intimations to Judges and Competitors—the placing of the stock, and the number of Competitors required for competition—the power to make provisionally an allowance for stock of merit, in the event of deficiency in number—authority to divide the three Premiums in the first, third, and fourth districts, into four—the first Premium, in either, not being under eight Sovereigns—the rules as to awarding first and second Premiums, and prohibiting Members acting as Judges who are also Competitors; the regulations relating to extra expenses, and the manner in which the reports are to be certified and transmitted, are severally hereby declared to be applicable to the Premiums for Sheep.

The Sheep exhibited for the Premiums in the second district must be certified, to the satisfaction of the Judges of competition, to have been selected from hirsels consisting of at least fifty, and in the third district from a hirsell not less than one hundred, of the same kind and age; that such hirsell has not been, at any time, selected from the rest of the Competitor's stock, or reared from a hirsell of selected ewes; that the hirsell has not, at any time, been fed on turnips or other green crop, nor upon artificial grasses, nor differently treated from the whole stock of the respective ages belonging to the Competitor, it being the object of the Society to award these Premiums for Cheviot Sheep, reared exclusively upon hill pastures—Lairg is fixed as the place of competition for the third district.

The *Note* annexed to the Rules of Competition for the Premiums for Cattle is applicable also to the Districts for Sheep, in which the Premiums will be continued by the Society for an additional period, on the conditions specified in the said note.

§ III. WORK HORSES.

PREMIUMS FOR IMPROVING THE BREED OF DRAUGHT HORSES.

1. *The Eastern District of Fifeshire.*
2. *The County of Ayr.*
3. *The Islands of Shetland.*

For the best Stallion, from three to twelve years old, for the improvement of the breed of Draught Horses, *bona fide* the property and in possession of any person within the East District of Fifeshire, kept for the use of the district, and shown within the same at such times and places as the Committee after named shall fix, from the 1st April to the 1st of August 1831—Ten Sovereigns.

For the best Mare for breeding Draught Horses, *bona fide* the property and in possession of any tenant in the said district, from 1st January 1831 to the day of competition—Eight Sovereigns.

For the best Three-year-old Colt or Filly, *bona fide* the property of and bred by any tenant in said district—Five Sovereigns.

For the best Stallion of the age and description above specified, kept to serve in the County of Ayr, and for this purpose to be shown at Kilmarnock, Mauchline, Ayr, and Maybole, at such times as the Members of the Society resident in the County may fix, at a meeting to be intimated by the Convener for the purpose from 1st April to 1st August 1832—Ten Sovereigns.

For the best Mare for breeding Draught Horses, *bona fide* the property and in possession of any tenant in the Second District, from 1st January 1832 to the day of competition—Eight Sovereigns.

For the best Three-year-old Colt or Filly, *bona fide* the property of and bred by any tenant in said district—Five Sovereigns.

The sum of Ten Sovereigns will be placed at the disposal of the Committee of the Society's Members in the Shetland Islands, to be applied by them in such proportions, and under such regulations, as they may fix, at a meeting to be called by the Convener for the purpose, in Premiums for Stallions and Mares, of the description best adapted for Agricultural purposes in these Islands.—The Competition to take place in 1832.

RULES OF COMPETITION.

The times and places where the Stallions are to be exhibited for the use of and within the Districts, and also the time and place of competition for the Premiums, are to be fixed by the Conveners, with the concurrence of at least a quorum of the respective Committees, and are to be published by the Convener at the church doors in due time, or in such other manner as shall be thought by him and a quorum of the Committee effectual for the information of those interested.

The Competition to take place betwixt 1st April and 1st August. The regulations for Cattle Shows in regard to fixing the competition—the previous intimations to Judges and Competitors—the power of the Judges to withhold the premiums if the animals produced shall be of inferior merit—those relating to extra expenses—and against Competitors being also Judges—and the manner in which the reports are to be certified and transmitted, are severally hereby declared applicable to the Premiums for Horses.

The following Members of the Society are appointed a Committee for regulating every thing relative to the competition in the First District, and judging thereat, viz. :—

The Earl of Leven and Melville; the Earl of Rosslyn; Sir John Oswald of Dunnikier, Bart; General Balfour of Balbirnie; F. Balfour, Esq. of Fernie; John Boswell, Esq. of Balmuto; Major J. Falconer Briggs of Strathairley; William Berry, Esq. of Tayfield; General Durham of Largo; R. Ferguson, Esq. of Raith; James Heriot, Esq. of Ramornie; Charles Kinnear, Esq. of Kinnear; J. W. Melville, Esq. of Mount Melville; D. Maitland Mackgill, Esq. of Rankeillour; J. Home Rigg, Esq. of Morton and Downfield; Colonel Oswald; Archibald J. Stewart, Esq. St Fort; Andrew Thomson, Esq. of Kinloch; Captain Wemyss of Wemyss, M. P.; H. Wedderburn, Esq. of Wedderburn; and any other members in the district.—The Earl of Leven, in his absence Major Briggs of Strathairley, Convener.

FOR THE SECOND DISTRICT.—John Ferrier Hamilton, Esq. of Westport, one of the Directors of the Society, Convener of the Committee of the resident members—three a quorum.

FOR THE THIRD DISTRICT.—William Mowat, Esq. of Garth, Convener of the Committee of the resident members.

§ IV. SWINE.

DISTRICT.—*The Counties of Aberdeen and Kincardine.*

For the best Boar, not under twelve months, nor exceeding four years old, *bona fide* the property and in possession of any tenant in the Counties of Aberdeen and Kincardine in autumn 1831—Seven Sovereigns.

For the second best—Three Sovereigns.

For the best Breeding Sow, of the same age—Four Sovereigns.

For the second best—Two Sovereigns.

These Premiums to be awarded for animals that are considered most profitable and best suited for the purpose of curing Mess Pork; and, if encouraging competition takes place, will be continued three years.—Attention is strongly recommended to the introduction of the Berkshire or Suffolk breed of swine, as being the best for curing pork.

The Competition is to be held at Aberdeen, at such time as the Society's Members resident in the County shall fix, at a meeting to be intimated by the Convener for the purpose. This meeting is also authorized to name a Committee for managing all details, and to fix the necessary regulations for Competition. A Report of the award of Premiums, with a copy of the regulations of Competition, to be transmitted to the Secretary on or before 10th December 1831.—Sir R. D. Horne Elphinstone, Bart., in his absence Alexander Thomson, Esq. of Banchory, to be Convener.

CLASS VI.

PRODUCTS OF LIVE STOCK.

§ I. CURING BUTTER.

DISTRICT—*The Parishes of Kirkmichael, Inveravon, Aberlour, Mortlach, Botriphnie, and Boharm, in Banffshire, and of Rothes and Knockando, in Elginshire.*

The Premiums given, and regulations suggested, for promoting an improved system of Curing Butter, having been productive of highly satisfactory results, the following Premiums are offered in the district above described.

To the owner of any Dairy in the above district, who shall make and cure the best quality of butter for the market, not being less than five cwt. (112 lb. to the cwt. of 16 oz. to the lb.) during the season 1832—Eight Sovereigns.

For the second best quality, as aforesaid—Five Sovereigns.

For the third best quality, as aforesaid—Four Sovereigns.

For the fourth best quality, as aforesaid—Three Sovereigns.

CONDITIONS.

The Butter must be certified on oath to have been made and cured on the competitor's farm, during the season 1832; and the affidavit must bear that the sample of one or more kits or firkins produced is a fair average of the quantity made and cured as aforesaid. It shall be inspected by a Committee of the Members of the Society resident within the district, at a meeting to be called by the Conveners for that purpose, at Charlestown of Aberlour, on such day as the Conveners may appoint. In the event of two or more competing lots being deemed equal in quality, the premium will be awarded to the larger quantity. Although not required as a condition, it is strongly recommended, as affording facilities for sales, that the Butter should be packed in firkins containing 56 lb. each. The successful

candidates, before receiving the premiums, are required to transmit to the Secretary a detailed report of the whole process followed by them in the manufacture of their butter. A report of the award of the premiums to be lodged with the Secretary of the Society, on or before the 10th December 1831. G. Macpherson Grant, Esq. of Ballindalloch; in his absence R. Wharton Duff, Esq. of Orton, and P. Stewart, Esq. of Auchlunkart, to be Convener.

The Convener has undertaken, on application to him, to furnish intending Competitors with a copy of Observations on Making, Curing, and Casking of Butter.

§ II. MAKING CHEESE.

1. IMITATION OF ENGLISH CHEESE.

DISTRICTS.

1. *The County of Wigton.*

2. *The County of Argyll.*

The sum of Fifteen Sovereigns will be placed at the disposal of Members of the Society, in *each* of the above districts, Five Sovereigns more being provided by each of the counties, or by any local Association therein, to be divided and apportioned in such manner as to the respective committees shall seem best, for the improvement of cheese-making in the said districts in 1832, under the regulations after mentioned.

CONDITIONS.

The cheese shall be made to resemble Stilton, Double Gloucester, or North Wiltshire, and the whole quantity made by each competitor shall not be less than one cwt. (112 lbs. of 16 oz.) A certificate on oath to be lodged with the Convener of the Committee, that the cheeses produced are a fair average sample of the kind competing, made in that year by the competitor, and one of the cheeses of the successful specimens shall be transmitted to the Secretary for the inspection of the Society.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies if he thinks proper, and the successful competitors, before receiving payment of their premiums, are required to transmit to the Secretary a detailed report of the whole process employed by them in the manufacture of their cheese, noticing the quantities of sweet milk cheese made by them, the object being not to produce a few superior cheeses, but to improve the system, which, in some districts of Scotland, where premiums have been given, has been found to have attained great perfection, as well as to ascertain the general quantity of superior sweet milk cheese to be procured from the district competing. The cheeses to be examined and the premiums

awarded by the local committee, at such place as the Society's members shall appoint, at a meeting to be intimated by the Convener for that purpose, and which meeting shall also name a committee for fixing such farther regulations as may be necessary, and arranging all details. A report of the award of the premiums to be transmitted to the Society, on or before the 10th December 1832.

The following members of the Society are named Conveners of the resident members, viz. :—

John Cathcart, Esq. of Genoch, for Wigtonshire, and Robert Maclachlan, Esq. of Maclachlan, for the county of Argyll.

2. SKIM-MILK CHEESE.

The Society being of opinion that in districts where Butter is the staple produce of the Dairy, Cheese made from skimmed milk may be so improved in quality as to be brought into successful competition with Dutch cheese, a large quantity of which, from the same material, is annually imported into this country, have resolved to offer district premiums for this object.

DISTRICTS.

1. *The County of Aberdeen.*
2. *The County of Dumfries.*

To the Owner of any Dairy, in each of the said districts, who shall make for sale, the best quality of Cheese, from skimmed milk, not being less than five cwt. (112 lb. to the cwt. of 16 oz. to the lb.) during the season 1832—Eight Sovereigns.

For the second best quality, as aforesaid—Five Sovereigns.

For the third best quality, as aforesaid—Two Sovereigns.

In the event of two or more competing lots being deemed equal in quality, the premiums to be awarded to the greater quantity, and one of the cheeses of the successful specimens shall be transmitted to the Secretary, for the inspection of the Society. The cheese must be certified on oath to have been made during the season 1832, from skimmed milk, without any admixture of cream, and that the samples of one or more cheeses produced, is a fair average of the produce of the Dairy.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies, if he thinks proper; and the successful candidates, before receiving their premiums, are required to transmit to the Secretary a detailed account of the whole process followed by them in the manufacture of their cheese. The cheeses to be inspected at

such place as the Society's members shall fix, at a meeting to be intimated by the Convener for that purpose, and which meeting, shall also name a committee for fixing such farther regulations as may be necessary, and managing all details. Sir R. D. Horn Elphinstone, Bart. Convener for the county of Aberdeen, and J. J. Hope Johnstone, Esq. of Annandale, M.P. Convener for the County of Dumfries. A Report of the award of the premiums to be transmitted to the Society on or before the 10th December 1832.

CLASS VII.

COTTAGES.

1. PREMIUMS IN MONEY TO COTTAGERS FOR THE CLEANEST KEPT COTTAGES.

DISTRICTS.

1. *The Counties of Moray and Nairn.*
2. *The County of Wigton.*
3. *The County of Banff.*
4. *The County of Ayr.*

In order to excite the attention of cottagers to keeping their cottages neat and clean, Ten Premiums of Two Sovereigns each, will be awarded to *Ten* Cottagers in *each* of the above districts, paying L. 5 of rent or under—or whose cottage and land annexed to it does not exceed that annual value—who shall be certified by two members of the Society, resident in the district, or by one member of the Society and the clergyman of the parish, to have been distinguished for the general neatness and cleanliness of the interior as well as exterior of his or her cottage (including the garden, should there be one attached to it), and to be *deserving*, on that account, of this mark of the Society's approbation.

CONDITIONS.

The certificate must bear that the cottage has been personally inspected by the parties granting it, and must give some description of the merits of the cottager in respect of the manner in which the cottage as well as the immediately adjoining space have been kept, specifying, at the same time, the name, designation, and residence of the competitor. For the First and Second Districts, the certificates must be transmitted to the Secretary of the Society on or before the 10th of November 1831, and for the Third and Fourth, on or before the 10th November 1832.

Should there be more than ten competitors in each District, the Society

will be influenced by the circumstances of the case in deciding what claims are to be preferred ; but, in every case, their decision will have regard exclusively to the neatness and cleanness with which the cottage and immediately adjoining space have been kept, and not to the construction of the cottage, or to the materials of which it is composed.

2. MEDALS TO COTTAGERS.

In the view of giving still farther encouragement to Cottagers of the above description, who do not reside in the counties in which the regular premiums are in operation at the time, and, at the same time, of giving aid to local associations and public spirited individuals, establishing or continuing, at their own expense, premiums for the like object, the Society have assigned six Cottage Medals annually to such associations or public spirited individuals as apply for the same, and may be desirous to add that testimony of approbation to such premiums as they themselves bestow. Applications for these medals must be accompanied by a report, certified in the terms required by the preceding conditions, describing the merits of the cottager, and the nature of the encouragement which has been afforded by the parties applying.

3. PREMIUMS TO COTTAGERS FOR PROMOTING ATTENTION TO THE CULTIVATION AND MANAGEMENT OF BEES.

DISTRICTS.

1. *The Counties of Banff, Moray, and Nairn.*
2. *The Counties of Fife and Kinross.*

To the Cottager in the first District paying L. 5 of rent, or under, or whose cottage and land annexed to it does not exceed that annual value, who, between 1st June and 1st October 1831, shall have raised the greatest number of Hives of Bees, not fewer than seven, from stocks his or her own property, none of the hives weighing under 20 lb., exclusive of the weight of the material of the hive or skep—A premium of Five Sovereigns.

To the Cottager in the same District who shall have raised the second greatest number, as aforesaid—Three Sovereigns.

To the Cottager in the same District who shall have raised the third greatest number, as aforesaid—Two Sovereigns.

Certificates of the number of Hives, and their several weights, making allowance for the weight of the skeps (which are to be weighed before

being used), signed by two Members of the Society, resident in the neighbourhood, or by one member and the clergyman of the parish, to be transmitted to the Secretary on or before 10th November 1831.

Similar Premiums will be given in the Second Districts for Hives raised between the 1st June and 1st October 1832.

CLASS VIII.

WOODS AND PLANTATIONS.

1. HONORARY PREMIUM FOR PLANTING.

To the Proprietor who shall communicate to the Society, on or before the 10th of November in any year, a satisfactory Report on the Planting of Land, founded on experiment; and who shall accordingly have planted on his own property an extent of not less than one hundred and fifty acres, within a period of five years preceding the date of his Report—The Gold Medal.

It is required that the report shall relate more especially to the tract of land which forms the subject of the communication, detailing the necessary particulars regarding its soil, climate, and exposure; the kinds, age, and number of the plants used; the mode of planting adopted, and the expenses of the work; and the writer is invited to state those more general observations on the principles and practice of planting which his knowledge and experience on the subject may enable him to communicate.

2. RAISING THE *PINUS SYLVESTRIS* FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between the 30th October 1830 and 30th October 1833, have raised, on rather poor nursery ground, and sold for planting, the greatest number of plants, not fewer than three millions, of the *Pinus sylvestris*, from seed imported from Norway, and taken off healthy trees in that country, or taken off healthy and free growing trees of the natural grown pine in the Highland districts of the counties of Aberdeen, Moray, and Inverness—Fifteen Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before 10th November 1833, affidavits in support of the collection of the

seed, specifying the quantity, and the district in which it was collected, with certificates, signed by two Members of the Society, specifying the soil and thriving state of the plants in the nursery ground, and an affidavit of the number of plants sold to be planted out for timber, and to whom they are disposed of. Competitors are requested to attend to a paper on the *varieties* of *Pinus sylvestris* by the late Mr Don of Forfar, published in the Memoirs of the Caledonian Horticultural Society, vol. i. p. 121.

3. RAISING LARCH FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between 30th October 1830 and 30th October 1833, have raised and sold for planting the greatest number of plants, not being fewer than one million, of the *Pinus Larix*, or Larch Fir, from seed imported from the Tyrol or other regions of the Alps, to which it is indigenous, and taken off healthy trees in the country—Thirty Sovereigns, or a Piece of Plate of that value.

Certificates, similar to those for the *Pinus sylvestris*, to be transmitted on or before the 10th November 1833.

CLASS IX.

IMPLEMENTS OF HUSBANDRY AND USEFUL MACHINES.

To the person who shall invent or improve any Instrument or Machine applicable to Husbandry or Rural Economy, and which, from its utility in saving labour or expense, simplicity or cheapness of construction, or other circumstances, shall be deemed by the Society deserving of public notice—The Silver Medal, or such sum in money as the communication shall appear to deserve.

The account of the implement must be accompanied by a model made according to a definite scale, to be deposited in the Society's museum. The model to be of sufficient dimensions, formed of wood or metal; and the notice or description transmitted with it must specify, according to the best of the Inventor's abilities, the purpose for which his invention or improvement is designed.

CLASS X.

GENERAL SHOW OF LIVE STOCK

AND

AGRICULTURAL MEETING AT INVERNESS IN 1831.

The Society having resolved to continue a General Show of Live Stock, Exhibition of Implements, and Roots and Seeds for Agricultural purposes, and having fixed the Meeting to be held at Inverness in the present year, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the counties more immediately connected with the Show,—from the town of Inverness,—from Local Associations,—and from individual Members. The Stock to be shewn at this Meeting must have been reared and fed by Proprietors or Tenants in Scotland, and must have been *bona fide* the property and in possession of the Competitors from 1st May 1831:—

§ I. CATTLE.

HIGHLAND BREED.

I. For the best Bull, not under three, nor exceeding six years old—Fifteen Sovereigns, or Plate of that value.

For the Second best ditto—Seven Sovereigns.

II. For the best breeding Cow, not under four, and not exceeding six years old—Ten Sovereigns, or Plate of that value.

III. For the best two Heifers, not under thirty-six, and not exceeding forty-five months old—Ten Sovereigns, or Plate of that value.

IV. For the best two Heifers, not under twenty-four, and not exceeding thirty-three months old—Seven Sovereigns, or Plate of that value.

V. For the best two Oxen, not under five, and not exceeding six years old—Ten Sovereigns, or Plate of that value.

VI. For the best two Oxen, not under twenty-four, and not exceeding thirty-three months old—Seven Sovereigns, or Plate of that value.

VII. For the best two Oxen, of the pure Highland breed, which have never been housed, not exceeding sixty-five months old—Ten Sovereigns, or Plate of that value.

VIII. For the best lot of Stirks, not fewer than six, and not exceeding twenty-one months old—Seven Sovereigns, or Plate of that value.

SHORT-HORN BREED.

IX. For the best Bull, of the pure Short-horn breed, not under four, and not exceeding seven years old—Fifteen Sovereigns, or Plate of that value.

X. For the best Cow, of the same breed, not under four, and not exceeding eight years old—Ten Sovereigns, or Plate of that value.

XI. For the best Ox, of the same breed, not exceeding five years old—Ten Sovereigns, or Plate of that value.

XII. For the best two Heifers, of the pure Short-horn breed, not exceeding thirty-three months old—Seven Sovereigns, or Plate of that value.

ABERDEENSHIRE HORNED BREED.

XIII. For the best Bull, not under three, nor exceeding six years old—Ten Sovereigns, or Plate of that value.

XIV. For the best Cow, of the same breed, not under three, nor exceeding seven years old—Ten Sovereigns, or Plate of that value.

XV. For the best Heifer, not exceeding forty-five months old—Five Sovereigns, or Plate of that value.

XVI. For the best Ox, not exceeding five years old—Five Sovereigns.

ABERDEENSHIRE POLLED BREED.

XVII. For the best Bull, not under three, and not exceeding six, years old—Ten Sovereigns, or Plate of that value.

XVIII. For the best Cow of the same breed, not under three, and not exceeding seven, years old—Ten Sovereigns.

XIX. For the best Heifer, not exceeding forty-five months old—Five Sovereigns.

XX. For the best Ox, not exceeding five years old—Five Sovereigns.

GALLOWAY BREED.

XXI. For the best Bull, not under three, nor exceeding six, years old—Ten Sovereigns, or Plate of that value.

XXII. For the best Cow, of the same breed, not under three, nor exceeding seven, years old—Ten Sovereigns, or Plate of that value.

XXIII. For the best Heifer, not exceeding forty-five months old—Five Sovereigns.

XXIV. For the best Ox, not exceeding five years old—Five Sovereigns.

ANY BREED,

Not being of the kinds above denominated.

XXV. For the best Bull, not under three, and not exceeding six, years old—Ten Sovereigns, or Plate of that value.

XXVI. For the best breeding Cow, not under four, and not exceeding six, years old—Ten Sovereigns, or Plate of that value.

XXVII. For the best Heifer, not exceeding forty-five months old—Five Sovereigns.

XXVIII. For the best Ox, not exceeding five years old—Five Sovereigns.

CROSSES.

XXIX. For the best Ox, of any breed, crossed with the Short-horn, shewing most symmetry, fat, and weight—Five Sovereigns.

XXX. For the best Ox, of any breed crossed with the Highland, shewing most symmetry, fat, and weight—Five Sovereigns.

XXXI. For the best Ox, crossed of any other breeds—Five Sovereigns.

For the Second best ditto—Three Sovereigns.

For the Third best ditto—Two Sovereigns.

§ II. SHEEP.

BLACK-FACED BREED.

CLASS I.—For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

II. For the best pen of five Ewes, not exceeding five years old, selected from a hirsle of a regular breeding stock not fewer than 200, and the pen having reared Lambs for the season to the 10th July—Five Sovereigns.

III. For the best Pen of five Gimmers—Five Sovereigns.

IV. For the best Pen of three Wedders, not more than four years old—Five Sovereigns.

V. For the best Pen of three Wedders of any age, showing most symmetry, fat, and weight—Five Sovereigns.

VI. For the best Pen of five Dinmonts—Five Sovereigns.

VII. For the best Pen of five Tup Lambs—Five Sovereigns.

VIII. For the best Pen of five Ewe Lambs—Five Sovereigns.

WHITE-FACED BREED.

IX. For the best two Tups of the indigenous White-faced breed of Scotland—Five Sovereigns.

X. For the best Pen of five Ewes of the same breed—Five Sovereigns.

CHEVIOT BREED.

XI. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

XII. For the best Pen of five Ewes, not exceeding five years old—Five Sovereigns.

XIII. For the best Pen of five Gimmers—Five Sovereigns.

XIV. For the best Pen of three Wedders, not under thirty-six months, and not exceeding four years old—Five Sovereigns.

XV. For the best Pen of three Wedders, not under twenty-four, and not exceeding thirty-three months old—Five Sovereigns.

XVI. For the best Pen of three Wedders of any age, showing most symmetry, fat, and weight—Five Sovereigns.

LEICESTER BREED.

XVII. For the best Tup, not under two years old—Five Sovereigns.

XVIII. For the best two Ewes, not exceeding four years old—Five Sovereigns.

CROSS BREED.

XIX. For the best Pen of three Wedders, a cross between the Black-faced and Cheviot breeds, and showing most symmetry, fat, and weight—Five Sovereigns.

XX. For the best five Dinmonts of a cross between these breeds—Five Sovereigns.

§ III. PIGS.

Class I. For the best Boar—Five Sovereigns.

II. For the best Sow—Five Sovereigns.

III. For the best three Pigs, not exceeding forty weeks old, and of a breed esteemed to be most profitable for the purpose of rearing and feeding for curing—Three Sovereigns.

§ IV. HORSES.

Class I. For the best entire Horse for Agricultural purposes, which shall have served Mares in a district north of the Spey, for the seasons 1830 and 1831—Twenty Sovereigns, or Plate to that amount.

II. For the best Breeding Mare for Agricultural purposes, having had at least one foal, and not being under six, nor exceeding twelve years old—Ten Sovereigns.

III. For the best three years old Filly for Agricultural purposes—Five Sovereigns.

IV. For the best two years old ditto—Five Sovereigns.

V. For the best entire Horse, not exceeding 14 hands 3 inches high, for the purpose of breeding a stout, punch, active description of Horse, of éasy keep, and adapted for Agricultural purposes in a Highland district—Ten Sovereigns, or Plate of that value.

VI. For the best Breeding Mare, for the same purposes—Five Sovereigns.

VII. For the best Highland Pony, for the saddle, not under four; and not exceeding seven years old, and not being more than thirteen hands high—Five Sovereigns.

VIII. For the best pair of four-year old Carriage Horses, bred in Scotland—Twenty Sovereigns.

IX. For the best pair of three-year old Colts, for Agricultural purposes—Ten Sovereigns.

§ V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above premiums, and not exceeding, in one lot, five Cattle or ten Sheep, and for Implements of Husbandry, Roots, and Seeds—Honorary Medals or Premiums will be awarded, to the value, in whole, of Fifty Sovereigns.

MEMORANDUM REGARDING SWEEPSTAKES.

The following is suggested as a skeleton list of Sweepstakes, to be added to, and arranged by Gentlemen bringing forward Stock, so as to comprehend the descriptions to which they purpose to be subscribers:

1. Best Morayshire Bull, not less than three years old.
2. Best Morayshire Ox,
3. Best ditto Spayed Heifer, } symmetry, fat, and weight.
4. Best Ayrshire Milch Cow, not under four years old.
5. Best Ayrshire Heifer
6. For the best Pen of five spayed Ewes, not under three shear.
7. For the best Pen of three Wedders, of any breed, cross, with the Black-faced breed.
8. For the best Mare for road or field.
9. For the best Colt, under four years old, for road or field.
10. For the best Lot of three Highland Ponies.

11. For the greatest variety and best quality of Stock, *bona fide* fed and exhibited by any one Competitor.

Sweepstakes to close, and Nominations to be made to the Clerks of Counties more immediately connected with the Show, or the Town-Clerk of Inverness, or to the Secretary of the Society at Edinburgh, before the 1st August 1831.

GENERAL REGULATIONS FOR THE SHOW.

1. The Competition will take place at Inverness, on Monday the 19th September next.

2. The name, residence, and post-town of the Exhibitor, the name of the Breed, the number of the Class in which the Animals are to be exhibited, their age, and, in the case of Fat Stock, the kind of food on which they have been fed, must be regularly certified, and the Certificate, signed by the Exhibitor, agreeably to the form annexed, must be duly lodged, as required by Article 3d.—The name and residence of the Breeder, and the Pedigree of the Stock, as far as known, must also be given.

3. The certificates must be lodged with the Secretary before twelve o'clock on Tuesday the 13th of September, at which time a list will be made up by him; and no Stock will be allowed to enter into competition, or to be shown, which is not included in that list. *Printed forms* of certificates may be had on application at the Society's Hall, No. 6, Albany Place, Edinburgh, or at the office of any of the County Clerks, or Secretaries of the Agricultural Associations connected with the Show, and Council Chambers, Inverness. On or before Monday the 12th September, the Secretary will be at Inverness, to answer inquiries, attend to details, and to receive certificates. In the mean time, certificates may be lodged with him at Edinburgh, or at Inverness with Provost Robertson, or Dr Inglis Nicoll, Secretary of the late Inverness-shire Farming Society.

4. A responsible person, on the part of the Exhibitor, must attend when the certificates are lodged, to give explanation, if it should be necessary, and receive instructions as to matters of detail at the Exhibition. The person or persons so attending must be acquainted with the various particulars required to be certified regarding the Stock of which they are in charge, more especially the mode of feeding in the case of Fat Stock; and it shall be competent to the Committee to require the Exhibitor, or the person in charge of the Stock, to confirm the certificates upon oath on the day of competition, in such cases as they think necessary.

5. A ticket or order will be delivered by the Secretary to the person in charge of each lot, for its being received into the Show Yard; and no Stock whatever can come within the premises without such warrant. One servant only for each lot can be admitted, and who must afterwards continue in charge of that lot in the Show Yard. Bulls must be secured by a

ring or screw in the nose, with a chain or rope attached, otherwise they cannot be admitted into the Show Yard.

6. The Stock exhibited for the Premiums are to be fed solely on farm-produce, including oil cake,—but excluding distillery wash and grains, as being accessible only to a few competitors. If oil cake has been used, the quantity is to be stated in the certificate.

7. The distance each Ox travels to the Show, and the date of being put to fatten, to be mentioned.

8. A competitor may show more than one lot in any class, but shall not gain more than one Premium for Stock in the same class. It shall not be competent to enter a lot in one class, and afterwards to withdraw it for competition in another class, unless by directions of the Committee. An animal having already gained the first premium in his class, at any of the Society's General Shows of Stock, which have been held at Edinburgh, Glasgow, Perth, or Dumfries, is not to be shewn again in competition in the same class, but may be exhibited as Extra Stock, or entered for Sweepstakes.

9. Gentlemen intending to exhibit Extra Stock, must intimate to the Secretary, and describe the Stock to be shewn, six days before the competition. Sweepstakes to be reported in due time, in order that proper judges may be appointed, and other necessary arrangements made.

10. The Stock exhibited will not be distinguished in the Show Yard by the name of the breeder, feeder, or owner (until after the premiums are decided), but by *Tickets* or *Numbers* to be affixed to each lot, corresponding to the list to be made up by the Secretary.

11. The Committee of the Society appointed to conduct the arrangements for the Show, will appoint skilful persons to act as Judges for the several classes, and to report to the Committee the lots which, in their opinion, are entitled to premiums. In forming their opinion, the Judges will have regard to the instructions to be delivered for their guidance, and particularly to symmetry, size, early maturity, purity, and general qualities characteristic of the different breeds they have to judge of, making due allowance for age, feeding, and circumstances peculiar to the cases which come before them.

12. The Committee of the Society, and the Judges to be named by them, will begin to view the Stock on the 19th September, at ten o'clock A. M. precisely; and the usual time will be allowed to the Judges for examining the Stock and forming their opinion, before the admission of any person, except a servant in the charge of each lot. To prevent confusion, the different lots must be brought to the ground, at or before eight o'clock in the morning.

13. On their arrival at the gate, instructions will be given, as to the particular part of the Show Yard to be occupied by each class. The Stock will be withdrawn, and the Show Yard shut at four o'clock.

CLASS XI.

GENERAL SHOW OF LIVE STOCK,

AND

AGRICULTURAL MEETING AT KELSO IN 1832.

The Society having resolved to hold the General Show of Live Stock and Agricultural Meeting for 1832, at Kelso, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Union Agricultural Society, and from the Noblemen and Gentlemen of the Counties more immediately connected with the Show.

The Stock to be shown, to be reared and fed by Proprietors or Tenants IN ANY PART OF GREAT BRITAIN, and to be *bona fide* the property of the Exhibitors.

§ I. CATTLE.

SHORT HORN BREED.

CLASS I. For the best Bull of the pure Short Horn Breed, not exceeding four years old—Fifty Sovereigns.

For the second best ditto—Forty Sovereigns.

For the third best ditto—Thirty Sovereigns.

It is a condition attached to the above Premiums, that the Exhibitor shall let out the Bull for season 1833, to serve in Scotland, provided a hire be offered equal to the Premium gained, together with the expense of conveyance to and from the hirer's residence, and the keeping of the Bull for the season.

II. For the best Cow of the pure short horn breed, of any age—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

III. For the best Heifer of the same breed, calved after the 1st January 1830—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

For the third best ditto—Five Sovereigns.

IV. For the best Heifer of the same breed, calved after 1st January 1831—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

V. For the best two Steers of the short horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1830—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

VI. For the best two Oxen of the short horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Fifteen Sovereigns.

DEVON BREED.

VII. For the best two Oxen of the pure Devon breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Fifteen Sovereigns.

HEREFORD BREED.

VIII. For the best two Oxen of the pure Hereford breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Fifteen Sovereigns.

GALLOWAY BREED.

IX. For the best two Oxen of the Galloway breed, shewing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

AYRSHIRE BREED.

X. For the best two Oxen of the Ayrshire breed, shewing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

ANGUS BREED.

XI. For the best two Oxen of the Angus breed, shewing most symmetry, fat, and weight, calved after 1st January 1828.—Ten Sovereigns.

WEST HIGHLAND BREED.

XII. For the best two Oxen of the West Highland breed, showing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

ANY BREED.

XIII. For the best Ox of any breed, pure or cross, shewing most symmetry, fat, and weight.—Ten Sovereigns.

§ II. SHEEP.

LEICESTER BREED.

CLASS I.—For the best Tup of the improved Leicester breed of any age—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

II.—For the best shearling Tup of the same breed—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

III. For the best pen of five Ewes of the same breed—Five Sovereigns.

IV. For the best pen of five Gimmers of the same breed—Five Sovereigns.

V. For the best pen of five Dinmonts of the same breed—Five Sovereigns.

CHEVIOT BREED.

VI. For the best three Tups of the Cheviot breed—Ten Sovereigns.

VII. For the best pen of five Gimmers of the same breed—Five Sovereigns.

VIII. For the best pen of five fat Wedders of the same breed, lambed in 1829—Five Sovereigns.

BLACK FACED BREED.

IX. For the best three Tups of the Black-faced breed—Ten Sovereigns.

X. For the best pen of five Gimmers of the same breed—Five Sovereigns.

XI. For the best pen of five fat Wedders of the same breed, lambed in 1828.—Five Sovereigns.

CROSS BREED.

XII. For the best pen of five fat Wedders of any cross.—Five Sovereigns.

§ III. HORSES.

CLASS I. For the best Stallion of the Clydesdale breed, not-exceeding eight years old—Twenty Sovereigns.

II. For the best Stallion of the Cleveland breed, not exceeding eight years old—Twenty Sovereigns.

The Exhibitor shall be obliged to let out the Horse for season 1833, to serve in Scotland, provided One Hundred Sovereigns, including the Premium, shall be offered at the Show, or within two months after it.

§ IV. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

II. For the best Sow—Five Sovereigns.

§ V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in any one lot, five Cattle and ten Sheep, and for Implements, Roots, Seeds, &c., Premiums will be awarded and apportioned by the Committee and Judges, in money, plate, or honorary medals, to the value in whole of Fifty Sovereigns.

MEMORANDUM REGARDING SWEEPSTAKES.

Lists for Sweepstakes will be made up in due time, for those Classes of Stock which may appear most likely to meet the views of Exhibitors on both sides of the Tweed. In the mean time nominations may be made to the Secretary of the Society at Edinburgh, or to George Jerdan, Esq., Secretary of the Union Agricultural Society at Kelso.

GENERAL REGULATIONS FOR THE SHOW.

The Competition will take place at Kelso in September 1832. The usual regulations of the Society with respect to General Shows of this kind, in so far as applicable to the Kelso meeting, and which will be published in detail in due time, must also be strictly adhered to.

THE VETERINARY SCHOOL.

This Establishment is now in its eighth session, under the Lecturer appointed by the Society, Mr Dick, a Graduate of the Veterinary College of London. Students from various parts of the country have received instruction in the anatomy and diseases of the horse, and other domestic animals, in the best system of treatment and cure, in stable management, and in the most approved and scientific modes of shoeing; several of these students have been sent up by Local Agricultural Associations, and others have attended on their own account. The hour of Lecture is accommodated to the convenience of students attending the Agricultural and other Classes in the University. Those students who attend two courses, and are afterwards found qualified at the annual examination by the Committee of Medical Examinators, receive Certificates.

Mr Dick occasionally delivers a Popular Course of Lectures to a class of gentlemen. The hour for the Popular Course in the present session is three o'clock afternoon.

The Lectures and Demonstrations for the Session 1831-1832 will be commenced in November next, at the usual Lecture-room in Edinburgh.

By order of the Directors,

CHARLES GORDON, *Dep. Secretary.*

PREMIUMS

OFFERED BY

THE HIGHLAND SOCIETY OF SCOTLAND

FOR PROMOTING

**AGRICULTURE AND INTERNAL IMPROVEMENT
IN SCOTLAND,**

IN

1832.

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PRELIMINARY NOTICE.

THE business of THE HIGHLAND SOCIETY OF SCOTLAND is conducted by a President, Four Vice-Presidents, Thirty Ordinary, and Ten Extraordinary Directors, a Treasurer, and Principal and Depute Secretaries, to which latter all communications are addressed. The Ordinary Directors are subdivided into Committees for the despatch of business, assisted occasionally by those Ordinary Members most conversant with the subjects to be discussed. The Report of each Committee is brought before the Directors collectively for farther procedure, and these proceedings are again submitted for approbation to a half-yearly General Meeting of the Society. One of the General Meetings is, by the Charter, appointed to be holden on the second Tuesday of January; the other on such day in the summer months as the Directors may fix; and the day so fixed is usually in the end of June, or early in July. New members are admitted at either of these General Meetings by ballot. They pay a small annual contribution of £1:3:6, or, in their option, and in full of all future claims, a life-subscription of Twelve Guineas. All Meetings of Directors, or Committees, are open; and at these, any member may attend and deliver his opinion on the subjects under consideration, though, in cases of division, the Directors or Members of the Committees only are entitled to vote. Members have access to the Society's Library, which is annually increasing, by the purchase or donation of books connected with the purposes of the institution.

When the Highland Society of Scotland was instituted in the year 1784, the object chiefly contemplated was the improvement of the Highlands—and hence the name which it assumed. But the great increase in the number of its Members since that time, the happy management of its funds, and the change in the general state of the country, have long enabled it to extend the design of its first institution, and direct attention to every part of North Britain where industry might be excited, or the useful arts improved.

The Society has, neither by its Charter of Incorporation, nor by its subsequent practice, been limited in its patronage to any one department of industry; but it has regarded, as the fitting objects of encouragement, every application of useful labour which might tend to the general good. But although its patronage be thus extended as regards its objects, circumstances have arisen to modify, in some cases, the application of it. The establishment of certain Boards, as for the encouragement of the Herring Fishery, and the like, has induced the Society to restrict its original views, and to devote its attention, and apply its funds, in a more especial manner to other objects, and chiefly to Agriculture and Rural Economy in their various branches.

In fulfilment of its purposes, the Society is every year accustomed to offer and award a variety of Premiums, as the means of eliciting and diffusing knowledge, as incitements to industry, or as the rewards for useful undertakings. These relate to every subject which may be supposed to fall within the plan of

the Institution :—such are, the Improvement of the Waste Lands of the country, by Tillage, by Irrigation, or by Draining,—the extension of Plantations, as the objects of ultimate profit, or of present embellishment and shelter,—the improvement of the breeds of Live Stock, and of the qualities of Wool,—the encouragement of certain domestic Manufactures,—the invention of Useful Machines,—and, not the least in interest and importance, the awakening the Industry of the Lower Ranks to such pursuits as shall promote their content, by ameliorating their condition.

Although certain subjects be thus selected as the objects of experiment or discussion, the patronage of the Society is not restricted to these objects. Its purpose being the promotion of general industry and improvement, it receives with favour every beneficial communication, and every statement of facts, which may admit of an useful application. A Mechanical Department exists for rewarding the original invention or subsequent improvement of all machines and implements for Agricultural purposes, the construction of those for other branches of Rural Economy, and of some for domestic convenience. Models of these are received and preserved ; and it is proposed, that, for the future, descriptions shall as speedily as possible, be conveyed to the Public of all such as may merit attention.

The Transactions of the Society were formerly printed by volumes :—Six were published in that form, which may be had of Messrs CADELL and Co. of Edinburgh, successors to the interest held by Messrs CONSTABLE and Co. in the Copy-right, and by whom they will be furnished to Members at 25 per cent. under the selling price.

The papers of the Society now appear periodically in “ THE QUARTERLY JOURNAL OF AGRICULTURE, AND THE PRIZE ESSAYS AND TRANSACTIONS OF THE HIGHLAND SOCIETY OF SCOTLAND,” published by Mr BLACKWOOD of Edinburgh, Mr CADELL of London, and Messrs CURRY & Co. Dublin.

All Communications relating to Premiums, as well as Papers or Reports for publication in the Transactions of the Society, and other subjects for the consideration of the Directors, are to be addressed to CHARLES GORDON, Esq. Depute-Secretary, at the Society's Hall, Albion Place, Edinburgh.

NOTICE TO CANDIDATES, AND GENERAL REGULATIONS OF COMPETITION.

WHEN subjects are specially selected for competition, it is always to be understood, 1st, That however concisely the subjects themselves be announced, ample information is required concerning them; 2^d, That this information shall be founded on experience or observation, and not on simple references and quotations from books; 3^d, That it shall be digested as methodically as possible; and, 4th, That Drawings, Specimens, or Models adapted to a defined scale, shall accompany Writings requiring them for illustration.

Certain conditions are annexed to each of the various subjects of competition, as detailed in the List of Premiums; and these are rigidly enforced by the Society, as the only means of ensuring regularity in the conduct of the business, and of distributing exact justice among the competitors.

In all Essays for competition, it is expected that when facts not generally known are stated, they are to be authenticated by proper references. Competitors in Essays shall not communicate their names, but shall transmit along with the Essays a sealed note containing their names and addresses, and inscribed on the back with some distinguishing motto or device, which shall also be inscribed on the Essay. When this regulation is neglected, such Essay shall not be received in competition. If the Essayist has formerly gained a Premium from the Society for a Paper communicated by him, it is recommended that his subsequent Essay shall be written in a different hand from that of the former successful Paper.

None of the sealed notes, except those which bear the distinguishing motto or device of the Essays found entitled to Premiums will be opened, and the sealed note will not in any instance be opened, without consent of the author, unless a Premium equal to at least one-half of the sum offered shall have been adjudged: But should no application be made for the Paper on or before the 1st of March in each year, it will be held as belonging to the Society on the terms proposed. Such Essays as are not found entitled to any Premium shall, with the sealed notes, be returned to the authors, if required. The Society is to be at liberty to publish the Essays, or extracts from them, for which the Premium, or part of it, shall be awarded.

Candidates are requested to observe, that, in any instance, when Essays, Reports, or Certificates, are unsatisfactory, the Society is not bound to give the reward offered; and that in certain cases, power is reserved of giving such part only of a Premium as the claim may be adjudged to deserve; but competitors may feel assured that the Directors will always be inclined to judge liberally of their several claims.

In all Reports of Experiments relating to the Improvement or Management of Land, it is expected that the expenses shall be accurately detailed. When Machines or Models are transmitted, it must be stated whether they have been elsewhere exhibited or described.

In all Premiums offered, having reference to Weight or Measure, the New or Imperial Standards are alone to be understood as referred to; and should Competitors in any instance refer to other Weights or Measures, the exact proportion which these bear to the New Standards must be accurately specified, otherwise the claim will not be entertained.

When the Premiums are awarded in Plate, the Society will, in such cases as the Directors may see proper, allow them to be paid in Money, on the application of the successful Candidates.

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ACCORDING TO PRIORITY IN DATE OF ELECTION.

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Jas. Campbell, Esq. younger of Craigie.

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*Those marked *, were elected at last Anniversary Meeting.*

PREMIUMS, &c.

HIGHLAND SOCIETY HALL,

EDINBURGH, Feb. 8. 1832.

THE HIGHLAND SOCIETY OF SCOTLAND does hereby advertise, That the under-mentioned **PREMIUMS** are to be given by the Society in the year 1832, &c.

ESSAYS, PLANS, AND REPORTS.

1. ACCOUNT OF THE QUARRIES IN SCOTLAND.

A Piece of Plate, of Fifty Sovereigns value, will be given for the best account of the Principal Quarries in Scotland, particularly those of Granite, Limestone (including Marble), Sandstone, and Slate, in so far as the writer's experience and means of information extend, detailing the mode and expense of working—the value of the saleable material raised—and the quantities by weight or measure—with any other particulars which may appear to be interesting, with relation to the public and private importance of such Quarries, the means of disposing of their produce, and any improvement in the modes of working them.

From those who may not find themselves able to extend their inquiries to the general subject of Quarries, as indicated above, accounts of individual Sale Quarries will be received, and Honorary Medals awarded, if the communication shall be deemed of sufficient importance and interest. Reports to be lodged by 20th October 1832.

2. GRASSES SUITED TO PASTURAGE IN WINTER.

It being necessary, in certain situations, that a considerable part of the live stock of this country should be kept in the fields during winter, it is desirable to ascertain which of the cultivated or natural Grasses are best suited for pasture during that season. The Society therefore offers Ten Sovereigns, or a Piece of Plate

of that value, for the best and approved Essay upon the subject, founded on observation or experience.

The writer is required to point out the Grasses and other pasture Plants which he has observed to bear the rigour of the season, and afford the most food during winter; and where he is unable to give the botanical names of such plants, he is required to transmit specimens of them collected at the time of flowering, and to state the situation in which they are found, and the character of the soils to which they seem adapted. He is farther invited to state, in so far as his means of observation extend, the advantages or disadvantages of saving grass lands, previous to winter, for the purpose of affording a rougher pasturage during that season. The Essays to be lodged by 20th October 1832.

3. ACCOUNT OF SALT-MARSHES IN SCOTLAND.

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Description of Salt Marshes, or grounds affording pasturage at low water in bays or estuaries of the sea in Scotland, detailing the nature of the soil, plants growing or which might grow on such lands, capabilities of improvement, and other relative circumstances; with a statement of the probable extent of land of this description. It is required that the plants referred to shall be specified by their botanical names. The Essays to be lodged by 20th October 1832.

4. FINE WOOLLED SHEEP.

Fine Wool being absolutely necessary for the manufacture of English Broad-Cloth, and there being some reason to believe that, by particular treatment, the finer woolled breeds of Sheep may be naturalized in Scotland, a Premium of Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved detail, founded upon authentic information or personal observation, of the mode of rearing, feeding, and managing the fine woolled breeds in those parts of the Continent of Europe, which most nearly resemble Scotland in climate, shelter, and herbage. Reports to be lodged by 20th October 1832.

5. ECONOMIZING FUEL AND LIGHTING IN PRIVATE DWELLINGS.

A Piece of Plate, of Fifteen Sovereigns value, will be given for the best and approved Essay on the best mode of economizing Fuel, in private dwellings, by consuming the smoke, or otherwise,

and also of lighting such houses by a simple apparatus for making and supplying Gas. The Essays to be founded upon actual experience of a satisfactory nature, and to be lodged by 20th October 1832.

6. PLANS OF COTTAGES.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best design of a set of Cottages, adapted for the accommodation of farm servants, ground labourers, or tradesmen, and for farm establishments, or country villages.

The set of designs to consist of—

1. A range of six connected Cottages for farm accommodation.
2. A series, consisting of single, double, treble, and quadruple Cottages, calculated either for farm purposes or village accommodation; and,
3. Designs for a range of farm-servants' or village Cottages, two stories in height; and also of a double or treble Cottage, with ground and attic floors.

Candidates are requested to notice, that these Plans are intended exclusively for the habitation of the working classes, and must therefore be designed with the strictest regard to economy; the simplest, yet substantial mode of construction, combined with the greatest possible convenience and utility, and admitting the most economical means of heating and ventilation; the whole being combined with general neatness of exterior, of a substantial and useful character, and divested of all unnecessary ornament and decoration.

Nos. 1, and 2. will consist of single story buildings, and No. 3, as already stated, of two story buildings, and each design will consist of the ground-plan, with elevations of at least two of the fronts, and a section shewing the heights and framing of the wood-work, each plan being accompanied by an estimate of the probable expense, calculated upon the principle of all the materials being laid on the ground, and of the ordinary quality and description, specifying what might be the difference of expense attending the use of slate, tiles, thatch, or heather, and composition, for the covering of the roofs, taking into account the difference of construction of the timber-work requisite for these respective coverings.

Competitors are specially invited to communicate, in a detailed and specific form, such explanatory and practical observations as may occur to them on the subject of the arrangement and construction of these designs, and in a particular manner to report

their opinion as to the most efficient and durable form of completing the walls and roofs of the buildings; and to afford minute information relative to the best and most approved composition roofs, with directions for preparing and applying the same, and the adaptation of such roofs to the climate of this country.

Competitors may, to such of the designs as may be considered improved thereby, add accommodation for a Cow, with a small Piggery; but they will particularly keep in mind, that the sole object of the Society is to obtain useful designs, and such only as can be generally applicable to the purposes required, and are properly adapted for the description of buildings contemplated;—and that no designs will be regarded as fulfilling the objects of this premium, unless they are prepared with strict reference to economy and utility, as well as the extent and nature of the accommodations indispensably requisite. As many gentlemen may have turned their attention to this subject, the Society conceive that the views entertained in offering these premiums may be most materially assisted by their communicating such information or suggestions as they possess, or may consider beneficial, to such Competitors as may be inclined to come forward.

The Plans to be lodged on or before the 20th October 1832.

7. REARING POULTRY.

Fifteen Sovereigns, or a Piece of Plate of that value, will be given for the best account, founded upon experience, of the most approved breeds of the different species of Domestic Poultry, suited to the climate of this country, comprehending a detail of the most economical modes of rearing, feeding, and fattening them, as well with a view to private use as for the market, particularly the various kinds of food best adapted for the purpose—the age at which the several species attain maturity, and may be used with the greatest advantage—and the benefit to be derived from resorting to the ancient, although in this country now almost obsolete practice, of rearing Capons; also the best construction and description of Poultry-Houses, with and without the application of artificial heat, and the most approved description of Poultry Yards, &c. The Essays to be lodged by 20th October 1832.

8. CURING MEAT.

The Society not being aware of the existence of any scientific account of the principles and practice of Curing Meat, and be-

lieving that an understanding of the principles would lead to an uniform and improved practice in all cases, a Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Essay on Curing Meat, in which the principles of the art must be pointed out and illustrated by reference to the best known methods adopted in practice, and in which must be explained the modifications required according to particular circumstances. The candidate will likewise be expected to communicate any improved chemical or mechanical means adapted to this end, with which he may be acquainted, or which he may himself devise.

The Candidate will have the option of receiving the above sum, or an Honorary Medal, and a sum not exceeding L. 15 to indemnify him for experiments. The Essays to be lodged by 20th October 1832.

9. REPORTS ON DAIRY MANAGEMENT IN HOLLAND.

The Honorary Gold Medal, or Twenty Sovereigns, will be given for the best Report on the General Management of Dairies in Holland, founded on personal observation.

The Report is required to detail the description of pasture and general treatment of the cows; the process of manufacture, whether of butter or cheese, or both; and to furnish a description of the dairy utensils, and how kept and cleaned; with an account of the milk and cheese houses, with reference to interior arrangement, position and ventilation, and such other circumstances as may appear useful and interesting. Reports to be lodged by 20th October 1832.

10. REPORTS ON DAIRY MANAGEMENT IN SCOTLAND.

To the person who shall, on or before the 20th of October in any year, transmit to the Society the best Report on the Management of a Dairy, of not fewer than ten Cows, in any District in Scotland—The Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

The Report will detail the mode of management in the dairy which forms the subject of the communication; the description of pasture, and general treatment of the Cows; whether Butter or Cheese forms the staple produce: the process of manufacture, and how disposed of; if Cheese, the kind or kinds

made; description of the milk and cheese houses, and of the utensils; with any other circumstances that may appear material.

11. THE COMPARATIVE ADVANTAGES OF FEEDING LIVE STOCK ON RAW OR ON PREPARED FOOD.

(1.) A Piece of Plate, of Thirty Sovereigns value, will be given for the best and approved Report, founded on actual experiment, on the comparative advantages of feeding Oxen or Heifers on food in a raw state, or in a boiled or steamed state.

The animals to be experimented upon shall not be fewer in number than six—three to be fed on raw food, and three on food boiled or steamed. The food employed shall in both cases be of the same class and the same variety. If Swedish Turnips, for example, in their raw state, be given to the one set of animals, Swedish Turnips, and no other kind, must be given in a boiled or steamed state to the other; and the same food must be continued for the whole period. The animals must farther be of the same breed, and the same age and sex; and each may receive, during the progress of the experiment, a given quantity of hay or straw. The term of feeding shall not be less than three months; and the live weight of each animal, before and after the experiment, must be particularly specified.

(2.) For the best Report, founded on actual experiment, on the feeding of Swine on food in a raw state, or on food in a boiled or steamed state—the sum of Ten Sovereigns, or a Piece of Plate of that value.

The Swine to be experimented upon shall not be fewer than ten in number; five to be fed on each kind of food respectively. They must be of the same age and the same breed; and the food employed must, as in the case of the oxen, be of the same description and variety.

Although the experiment, if made on six Oxen or Heifers, and on ten Swine, as above specified, will be held as complying with the conditions of the premium, it will be regarded as satisfactory that a greater number of animals be selected, and a variety of food employed.

The competitors are further invited to communicate the result of any observations they may have previously made on the relative advantages of the two modes of feeding, and to state the comparative expense attending each. Reports to be lodged by the 20th October 1833.

12. SEA-WEED AS A MANURE.

A Piece of Plate, of Ten Sovereigns value, will be given for the best and approved account, founded on experience, of the use of sea-weed as a manure in its raw or unmanufactured state.

The reporter will be required to describe the different kinds of sea-weed, either by their botanical names, or those by which they are commonly known; the soils on which they should be used, particularly those to which they are most applicable; the different kinds of crops raised, the quantity applied per acre, the seasons when they should be put on the land, and its effects as compared with other manures. The reporter will also be required to describe any cheap process, by drying or compression, rendering the weed more portable, the expense of the process and the utility of sea-weed as a manure in this state, compared with it before being dried or compressed. Reports to be lodged by 20th October 1833.

13. KELP AS A MANURE.

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Essay, founded upon experiment, giving a detailed practical account of a cheap and efficient mode of rendering Kelp applicable to Agriculture as a Manure, either by a new process of manufacturing the weed, or by combining it with some other cheap substance, either after the sea-weed is formed into kelp, or during the process of manufacture. The expense of the process, and of the substances used, to be stated. The Essays to be lodged by 29th October 1833.

14. REPORTS ON IMPROVED RURAL ECONOMY ABROAD.

The Honorary Gold or Silver Medal of the Society will be given for the best accounts, founded on personal observation, of any useful practice or practices in rural or domestic economy adopted in other countries, which may seem fitted for being introduced with advantage into Great Britain.

For the most approved communication under this head, which shall be rendered on or before the 20th October in each year, the Society's Honorary Gold Medal will be awarded; and for all other communications in the same year, which shall be approved of, the Society's Honorary Silver Medal.

However advanced the state of the useful arts may be considered in this kingdom, it is not to be doubted that there are many practices in use, both of domestic and rural economy, in other countries, and particularly in France, the Low Countries, and the North of Germany, highly deserving of attention or imitation, and which yet are too apt to be disregarded or unnoticed by the traveller or casual resident. The purpose chiefly contemplated by the offer of the present premium, is to induce gentlemen, who may visit other countries, to take notice of and record such particular practices as may seem calculated to benefit their own country, in the branches of the arts referred to ; and it is proposed that the earliest opportunity shall, in all cases, be taken of communicating such details to the public.

15. HONORARY PREMIUM FOR AN ACCOUNT OF ANY DISTRICT IN SCOTLAND.

To the person who shall, on or before the 20th of October, in any year, furnish to the Society the best Account of any District in Scotland, with reference to the present state of Husbandry and the progress of rural and general improvement—the Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

In describing the present state of Husbandry in the district, the writer is required to advert to the general character of the soil and surface—to direct attention especially to the more recent improvements that have been made, or that may be in progress, in the modes of tillage, the breeds of stock, the state and management of roads, the progress of plantations, and the like ; and generally to offer such suggestions as may admit of practical application regarding the future improvement of the district.

CONDITIONS OF COMPETITION.

The conditions of competition for Essays, Plans, and Reports will be found under the " Notice to Candidates," prefixed to the List of Premiums, p. 7. and to which competitors are referred.

The essays, plans, and reports on subjects 1, 2, 3, 4, 5, 6, 7, 8, and 9, are to be lodged at the Society's Hall, on or before the 20th of October next 1832 ; those on subjects 11, 12, and 13, by 20th October 1833 ; and reports on subjects 10, 14, and 15, by the 20th of October in any year.

EXPERIMENTS AND IMPROVEMENTS.

CLASS I.

WASTE LANDS.

1. HONORARY PREMIUMS FOR IMPROVEMENT OF LAND BY TILLAGE.

1. To the Proprietor or Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory report of his having, within the period of five years immediately preceding the date of his communication, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than one hundred acres—The Gold Medal.

The Report may comprehend such general observations on the Improvement of Waste Land as the writer's experience may have led him to make; but it is required to refer especially to the land reclaimed, (which, if not in one continuous tract, must be in fields of considerable extent), to the nature of the soil, the previous state of the ground, the obstacles opposed to its improvement, the mode of management adopted, the expense, and, in so far as can be ascertained, the produce and value of the subsequent crops; and the land must have borne one crop of grain, at least, previous to the year in which the report is made. The report must be accompanied by a certified measurement of the ground.

2. To the Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory Report, of his having, within the period of three years preceding the date of his report, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than thirty acres on the same farm—The Honorary Silver Medal.

The honorary premium for this more limited extent is offered under the same conditions as that for No. 1. of this class; but competitors will observe, that, having gained the Silver Medal, it shall not afterwards be competent to include the same improvement in a subsequent claim for the Gold Medal. Reports detailing particulars as required in reference to the premium No. 1. of the class, accompanied by a certified measurement of the ground, to be transmitted to the Society before the 10th of November in any year.

CLASS II.

CROPS AND CULTURE.

1. NEW PLANTS ADAPTED TO FIELD CULTURE.

To any Person who shall, on or before the 20th October, in any year, report to the Society any new species or variety of useful Plant, adapted to the ordinary field culture of Scotland—The Silver Medal, or a Piece of Plate, as the Directors may see fit, in the circumstances of the case.

Satisfactory evidence will be required that the plant produced is new in the cultivation of the country, either as regards the species or variety, valuable as regards the uses to which it may be applied, and congenial to the soil and climate of Scotland. A particular detail of the discovery or circumstances which led to the experiment must be furnished, the mode of culture described, and a specimen of the plant transmitted.

2. COMPARATIVE VALUE OF DIFFERENT VARIETIES OF THE POTATO.

(1.) POTATOES FOR FIELD OR FARM CULTURE.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and most satisfactory descriptive account, founded on actual experiment, of the different varieties of the Potato, best adapted for field culture. It is required that the report shall correctly detail the names and synonyms, the character of each kind as to its being prolific, early or late, oblong or round shaped, waxy or mealy, red or white, liable to disease, or free from that tendency; the productiveness, both as regards general quantity per rood in imperial bushels, and quantity of flour from a given weight of the clean tubers, say 28 lb.; the mode of preparing the sets, planting, and earthing up; also the keeping properties of the different varieties, so far as the writer's experience enables him to afford information on their qualities for keeping, and such other points as may appear material.

Is to be understood that all kinds of Potatoes raised in the field are included, whether for domestic use, as the Early Champion, Breadfruit, Rednose Kidney, &c. or for feeding stock, as the Yam, Oxnoble, &c. Competitors may adopt such mode of culture, quantity and quality of manure, distance of the sets and rows, period of planting, and the like, as may seem best; but evidence

will be required that all the varieties brought into competition with each other shall have been raised in similar circumstances as regards soil, manure, and general culture, and that they have been grown in the same season. The quantity of each variety raised by the Competitor must be certified by two members of the Society, or by the affidavit of the Competitor, to have been not less than four bushels.

Reports, accompanied by a sample of one peck of each kind of the potatoes, in bags correctly labelled, must be lodged with the Secretary, at the Society's Hall, on or before the 1st December 1834.

(2.) POTATOES FOR GARDEN CULTURE.

Ten Sovereigns, or a piece of Plate of that value, will be given for the best and most satisfactory descriptive account, founded on actual experiment, of the different varieties of the Potato best adapted for Garden culture. The Report to detail correctly the names and synonyms, and the description of the qualities, and keeping properties, as required in reference to field potatoes. The kind of manure employed, the quality of the soil, the distance between the sets and rows, the relative size of the leaves, and their inclination to stand upright or to droop, the tendency to produce flowers or the absence of that tendency, the liability to curl or the freedom from that disease, to be severally mentioned.

Reports, accompanied by Certificates of two Members of the Society, or by the affidavit of the Competitor, that at least four pecks of each sort have been raised by him under similar circumstances, and in the same season, and by one peck of each sort, in bags properly labelled, to be lodged with the Secretary at the Society's Hall, on or before the 1st of December 1834.

3. FEEDING OFF TURNIPS BY SHEEP.

The Society being of opinion that the practice which obtains, in some districts of England, and of the south of Scotland, of feeding off turnips on the ground by sheep, may be advantageously introduced into other districts, in certain soils and situations, offers the following premiums, in the districts after mentioned, viz.—

1. *The Crieff District of Perthshire, comprehending the parishes of Crieff, Monyvaird, Strowan, Comrie, Monzie, Madderty, Trinity Gask, and Fowlis Wester.*
2. *The Eastern District of Ross-shire.*

3. *The Stewartry of Kirkcudbright.*

4. *The County of Ayr.*

5. *The County of Sutherland.*

To the farmer in each of the first and second districts, who, in the year 1831, shall have cultivated, in drill, the greatest extent of turnips, not being under ten acres, in proportion to the extent of his land under a regular system of rotation, and of which at least one-half shall be eaten off on the ground by the feeding of sheep, carefully and regularly inclosed with hurdles or nets, and upon land well adapted to the purpose—Ten Sovereigns.

To the farmer in each of the said districts, who shall have cultivated and fed off the next greatest extent, as aforesaid, not being less than four acres—Five Sovereigns.

To the farmer in the third district, who shall, in the year 1832, cultivate the greatest extent of Turnips, in drill, estimated as aforesaid, not being under ten acres, and of which at least one-half shall be eaten off on the ground, in manner before specified—Ten Sovereigns.

To the farmer in the third district, who shall cultivate and feed off the next greatest extent, not less than four acres—Five Sovereigns.

To the farmer in each of the fourth and fifth districts, who shall, in the year 1833, cultivate the greatest extent of Turnips, in drill, estimated as aforesaid, not being under ten acres, and of which at least one-half shall be eaten off on the ground, in manner before specified—Ten Sovereigns.

To the farmer in each of the fourth and fifth districts, who shall cultivate and feed off the next greatest extent, not less than four acres—Five Sovereigns.

In any portion of the field, reserved to be fed off by sheep, the blanks left by the turnips removed shall not exceed five drills, so as the benefit of this mode of feeding, arising from the treading and manure of the stock so fed, may be distributed over the whole of such portion.

Competitors for the Premiums in the 1st and 2d Districts, will transmit to the Secretary of the Society, on or before 10th November 1832, an affidavit, specifying the extent of their Farms, under a regular system of rotation, the extent under turnips, in 1831, the kind or kinds raised, the proportion fed off by sheep, the manner in which it was done, and within what period; description of sheep so fed, and whether they were the claimants'

own stock, or were sent for feeding by another ; and, in the last case, the price obtained per acre will be stated. The affidavit to be accompanied by a certificate of two members of this Society, in support of the matters therein detailed.

The like certificates, for the 3d District, to be transmitted by 10th November 1833 ; and, for the 4th and 5th Districts, by 10th November 1834.

4. CULTIVATION OF LAND BY MANUAL LABOUR.

It having been supposed that, under certain circumstances, the Spade may be advantageously substituted for the Plough, for the cultivation of particular crops, the Society, in order to obtain practical and satisfactory information on this subject, offers the following Premiums :—

Twenty Sovereigns, or a Piece of Plate of that value, will be given to the tenant or occupier of land in Scotland who shall cultivate with the Spade the greatest extent, not under six acres, of field land, during the years 1831 or 1832, such land having been formerly under tillage.

For the second greatest extent, as aforesaid, not under four acres—Ten Sovereigns.

CONDITIONS.

The Reports must specify the extent of land cultivated; the number of labourers employed, and the period for which they were employed, with a detailed statement of the whole expense incurred ; the kind and quantity of manure employed ; the depth to which the land had been dug or trenched ; the kind of crops ; the amount, weight, and value of the produce, and any other information that may be considered useful. Reports to be lodged with the Secretary by 20th December 1832 ; accompanied by a certified measurement of the ground, and by certificates of two members of the Society, in support of the several matters therein detailed.

5. PLOUGHING COMPETITIONS.

Premiums to ploughmen for improvement in ploughing having for some years been given very generally over the country by the resident gentlemen, and local Agricultural Societies, the Highland Society has, in the mean time, discontinued them ; but being desirous of encouraging improvement in this branch of husbandry, the Society will give its Silver Plough Medal to the ploughman found to be the best at such competition, provided not fewer than fifteen ploughs shall have started. The Medal will be issued upon a report from one or more Members of the Society,

who shall have actually attended the competition, stating the number of ploughs that had started, and that the ploughman found to be the best had not received the Society's Medal at a previous competition in the same district.

The Reports must be lodged with the Secretary, at the Society's Hall, within three months after the competition, otherwise the Medal will not be issued.

CLASS III.

PASTURES.

1. LAYING DOWN LANDS TO PERMANENT PASTURE.

The Gold Medal, or a Piece of Plate, will be given to the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November, in any year, report to the Society the most successful experiment in the laying down of land to permanent pasture, either wholly with the indigenous grasses, or with a mixture of these grasses and clover, or other plants adapted for herbage.

The land which has formed the subject of experiment must have been pastured for at least one season, exclusive of that in which the report is given in; the extent of the ground must not have been less than ten acres; and a certified account must be transmitted of the kinds and quantity of the grass seeds sown.

In offering this premium, the Society does not express any opinion regarding the expediency of keeping land in a state of permanent grass, rather than in a course of alternate tillage, nor regarding the supposed superiority of several of the native grasses for the purpose of pasture, over the artificial grasses so long and beneficially employed in Scottish agriculture. The Society merely proposes to obtain information and promote experiment, and to direct attention to a branch of rural economy supposed to have been hitherto less attended to, and less successfully practised in Scotland, than the alternate husbandry.

The Reporter, while he is required to state the results of this experiment to which his own report refers, is invited to communicate such farther information as his experience enables him to give, regarding the general management of land in a state of perennial pasturage, the means which may be employed for maintaining or increasing the productiveness of the herbage by top-dressing or otherwise, and the modes which have been found most successful in practice for destroying mosses and other injurious plants in the sward.

2. COMPARATIVE ADVANTAGES OF LAYING DOWN LANDS TO PASTURE, WITH AND WITHOUT A WHITE CROP.

There being reason to believe that the sacrifice of a white crop, in laying down lands to pasture, will, under many circumstances, be counterbalanced by the superior produce of grass, the Society is induced to offer the following premium :—

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved comparative report, founded upon actual experience in Scotland, of land laid down to pasture with the indigenous grasses adapted to the particular soil, without any white crop along with the grass seeds; and of land in similar circumstances of soil, climate, and condition, sown down with the same grasses along with a white crop.

The extent of land in each experiment not to be less than seven acres; and a particular statement is required of the kinds and quantities of the grass seeds used, with a distinct account of the kind and number of stock pastured upon each field, with their comparative progress in condition, for three successive seasons. The sort of grain sown as white crop must be likewise reported. A hay crop is of course excluded.—Reports to be lodged by the 10th November 1832.

3. SAVING THE SEEDS OF NATURAL GRASSES.

The demand for the Seeds of Natural Grasses having much increased, and the Society being satisfied that these seeds may be advantageously saved in Scotland, offer the following premiums :—

Ten Sovereigns, or a Piece of Plate of that value, will be given to the person in Scotland who shall save the largest quantity and the best quality of the greatest number, or of all the following grasses, viz.—

Alopecurus pratensis.

Dactylis glomerata.

Festuca pratensis.

Phleum pratense.

Poa trivialis.

To the person who shall save the second largest quantity, and best quality, Five Sovereigns.

Reports detailing the mode adopted, and accompanied by satisfactory evidence, that the quantity saved of any of the above seeds, has not been less than twenty bushels, and also with samples of the seeds saved, must be lodged with the Secretary, at the Society's Hall, on or before the 1st of November 1834.

Note.—The Seedsman to the Society will give the highest wholesale prices to the successful Candidates, to the extent of one hundred bushels of each sort raised as above; and he will treat with Competitors generally for their produce.

CLASS IV.

LIVE STOCK—DISTRICT COMPETITIONS.

§ I. CATTLE.

PREMIUMS FOR IMPROVING THE BREED OF CATTLE IN THE FOLLOWING DISTRICTS :—

1. *The Eastern District of Forfarshire, comprehending the parishes of Montrose, Menmure, part of Edzel, Cariston, Oathlaw, Arbroath, Lunan, Guthrie, Kinnell, Monifieth, Maryton, Brechin, Lethnot, Lochlee, Craig, Aberlemno, Carmylie, Panbride, Rescobie, Inverkeillor, Monikie, Farnwell, Fearn, Stricathro, Dun, Logie-Pert, Tannadice, Barrie, Kirkden, St Vigean, and Arbirlot.*
2. *The Districts of Morven, Ardnamurchan, Sunart, and Kingerloch, in the county of Argyll.*
3. *The Districts of Moidart, Arisaig, and Knoidart, including the islands of Eig, Rum, and Canna, in the counties of Inverness and Argyll.*
4. *The Islands of Shetland.*
5. *Wigtonshire.*
6. *The Island of Arran.*
7. *The Districts of Mid and Nether Lorne, in the county of Argyll, comprehending the parishes of Ardhattan and Muckairn; that part of the parishes of Inishail and Kilchrenan lying north of Loch-Awe; the parishes of Kilmore and Kilbride; the parish of Kilninver; that part of the parish of Kilmelfort, lying within the district of Lorne; and the parishes of Kilbrandon and Kilchattan.*
8. *Clackmannanshire, including the parishes of Culross, Fossaway, Tulliallan, Muckhart, Logie, and Glendevon, in the county of Perth; and Alva in Stirlingshire.*
9. *The following parishes in the counties of Stirling, Dumbarton, and Perth, viz. Drymen, Buchanan, Balfron, Gargunnoch, St Ninian's, Kippen, Baldernoch, Killearn, Strathblane, Fintry, Kilmaronoch, East and West Kilpatrick; that part of Bonhill to the east of the Leven, Dumbarton, Aberfoyle, and Port.*
10. *The District of Kincardineshire comprehending the parishes of*

- Fettercairn, Fordoun, Marykirk, Garvock, Laurencekirk, Arbuthnott, Glenbervie, and that part of the parish of Edzell in Kincardineshire.*
11. *The District of Aberdeenshire comprehending the parishes of Strathdon, Glenbucket, Cabrach, Towie, Tarland and Migvie, Logie-Coldstone ; those parts of the parishes of Coul and Tulloch in Cromar ; those parts of the parishes of Glenmuick, Glengairn, and Tullich, and of Crathie, which are on Gardenside and in Morven.*
 12. *The District of Buchan, in Aberdeenshire, from the River Ythan on the south, to the River Doveran on the north and west, including also the adjoining parishes of Logie-Buchan, Foveran, and Methlick, in the District of Fomartin.*
 13. *The District of Huntly, comprehending the following parishes in the counties of Aberdeen and Banff, viz. Huntly, Cairnie, Gartly, Rhynie, Auchindoir and Kearn, Kildrummie, Clatt, Kinnethmont, Cabrach, Glass, Mortlach to the north and east of the rivers Fiddich and Dullan, Boharm, Botriphnie, Drumblade, and Forgue.*
 14. *The West Teviotdale District in the counties of Roxburgh and Selkirk, comprehending the parishes of Hobkirk, Kirkton, Cavers, Hawick, Roberton, Wilton, Southdean, Minto, and Lilliesleaf.*
 15. *Kinross-shire District.*
 16. *Dumbartonshire District.*
 17. *The parishes of Greenock, Port-Glasgow, Kilmacolm, Largs, and Innerkip, in the counties of Renfrew and Ayr.*
 18. *The Island of Mull, Argyllshire, including the Islands of Coll, Tyree, Ulva, Icolmkill, and other small isles adjacent.*
 19. *The District in the west of Perthshire, comprehending the parishes of Callander, Kilmadock, Kincardine, Comrie, and Balquhiddy, with that part of the District of Breadalbane comprising Glenlochry, Glendochar, and Glenfalloch.*

For the best Bull, from two to seven years old, *bona fide* the property, and in possession, of any proprietor or tenant in each of the eleven Districts, Nos. 1, 5, 8, 9, 10, 11, 12, 13, 14, 15, and 17, as above described, kept on his farm within the District; from the 20th day of May preceding the day of competition—Ten Sovereigns.

For the second best Bull, of the age above specified, *bona fide*

the property, and in possession, of any proprietor or tenant in *each* of the said eleven Districts, and kept on his farm, within the District, for the aforesaid period—Five Sovereigns.

For the best Bull, from two to seven years old, *bona fide* the property, and in possession, of any proprietor or tenant in *each* of the eight Districts, Nos. 2, 3, 4, 6, 7, 16, 18, and 19, as above described, kept on his farm within the District, from the 20th day of May preceding the day of competition.—The Honorary Silver Medal.

For the best Bull, of the age above specified, *bona fide* the property, and in possession, of any tenant in *each* of the said eight Districts, Nos. 2, 3, 4, 6, 7, 16, 18, and 19, kept on his farm, within the District, from the 20th day of May preceding the competition—Ten Sovereigns.

For the second best Bull, of the same age, in *each* of the said eight last mentioned Districts, the property, and in possession, of any tenant, and kept on his farm, within the District, for the foresaid period—Five Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant in *each* of the nineteen Districts above-mentioned (Shetland, No. 4., and Kinross, No. 15. excepted)—Five Sovereigns.

For the second best two Queys, of two years old, the property of, and bred by, any tenant in *each* of the nineteen Districts above mentioned (Shetland, No. 4., and Kinross, No. 15. excepted)—Three Sovereigns.

For the best Quey, of two years old, the property of, and bred by, any tenant in the Shetland district, No. 4.—Five Sovereigns.

For the second best Quey, of two years old, the property of, and bred by, any tenant in Shetland—Three Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor of land under L. 300 of yearly rent or value, in the Kinross district, No. 15.—Five Sovereigns.

For the second best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor, as aforesaid, in Kinross-shire—Three Sovereigns.

The Premiums in the 2d, 3d, 6th, 7th, and 18th Districts, are limited to the West Highland Breed; in No. 17. to the Ayrshire Dairy Breed; in No. 5. to the Galloway breed; and for *Bulls* Shown in the 14th, to the Short-horned breed.

The competition in the Districts Nos. 1. to 13., both inclusive, will take place in 1832. In Nos. 14, 15, and 16, the first and second competitions under the system of alternate years having been held in 1829 and 1831, the third competition will be in 1833. The first competition for Nos. 17, 18, and 19, having been in 1831, the second will be in 1833. In the intermediate years, such premiums only as shall be given by the gentlemen of the respective districts, or by local associations therein, are to be competed for.

The following Members of the Society (as Members only, or their Factors in their absence, can be named) are hereby appointed Committees for regulating all details and judging at the competitions for the thirteen districts first above-mentioned. In the six last mentioned districts, the Committees were named in the advertisement of 1831.

FOR THE FIRST DISTRICT.—The Earl of Airlie; Lord Panmure; Lord Gillies; the Honourable D. Ogilvy; the Honourable W. Ogilvy; the Honourable Fox Maule; Sir John Ogilvy of Inverquharity, Bart.; Sir James Ramsay of Bamff, Bart.; David Blair, Esq. of Cookston; David Blair, Esq. younger of Cookston; David Carnegie, Esq. of Craigo; James Carnegie Arbuthnot, Esq. of Balnamoon; W. Fullarton Lindsay Carnegie, Esq. of Boysack; Thomas Drummond, Esq. younger of Newton; Robert Douglas, Esq. of Brighton; Alexander Greenhill, Esq. of Fearn; James W. Hawkins, Esq. advocate; David Hunter, Esq. of Blackness; James L'Amy, Esq. of Dunkenny; George Lyon, Esq. of Glenogil; Gilbert Laing Meason, Esq. of Lindertis; John Ochterlony, Esq. of Gwynd; John Patullo, Esq. of Longhaugh; George Robertson Scott, Esq. of Hedderwick; Captain Robert Scott of Abethune; Robert Speid, Esq. of Ardvie; Henry Stephens, Esq. Balmadies; P. Wedderburne, Esq. of Newgrange; Mr Crow, Kincaig; and any other Members residing in the district; five a quorum. Lord Panmure, Convener.

FOR THE SECOND DISTRICT.—Sir James M. Riddell, Bart.; R. G. Macdonald, Esq. of Clanranald; Colonel Robertson Macdonald of Kinlochmoidart; Hugh Maclean, Esq. younger of Coll; Campbell D. Riddell, Esq.; William Robertson, Esq. younger of Kinlochmoidart; John Gregorson, Esq. of Ardtornish; Angus Macdonald, Esq. of Glenaladale; and any other Members in the District; two a quorum. Sir J. M. Riddell, Bart. Convener.

FOR THE THIRD DISTRICT.—Sir Duncan Cameron of Fassfern, Bart.; R. G. Macdonald, Esq. of Clanranald; Angus Macdonald, Esq. of Glenaladale; Colonel Robertson Macdonald, of Kinloch-

moidart; William Robertson, Esq. younger of Kinlochmoidart; Captain Gordon Cameron of Letterfinlay; Alexander Macdonald, Esq. of Lochsheal; Dr Maclean at Rum; and Mr Chisholm at Irin; three a quorum. Mr Macdonald of Glenaladale, Convener.

FOR THE FOURTH DISTRICT.—Lord Dundas; Sir Arthur Nicholson, Bart.; William Mowat, Esq. of Garth; Robert Bruce, Esq. of Symbister; John Bruce, Esq. younger of Symburgh; Robert Hoseason, Esq. of Mossbank; and any other Members in the District; two a quorum. Mr Mowat of Garth, Convener.

FOR THE FIFTH DISTRICT.—The Earl of Galloway; Lord Viscount Gairlies; Sir Wm. Maxwell, Bart.; Sir James Dalrymple Hay, Bart.; Sir David Maxwell, Bart.; Sir Andrew Agnew, Bart. M. P.; James Blair, Esq. of Penningham, M. P.; John Adair, Esq. of Genoch; Colonel Vans Agnew of Sheuchan; Forbes Hunter Blair, Esq. of Dunskey; Nicol Brown, Esq. of Waterhaughs; Edward Boyd, Esq. of Mertonhall; John Cathcart, Esq. of Genoch; William Hamilton, Esq. of Craichlaw; Hugh Hathorn, Esq. of Castlewig; Vans Hathorn, Esq. of Garthland; Col. Macdougall of Logan; Lieutenant-Colonel Macdougall, Stranraer; James Carrick Moore, Esq. of Corswall; Stair Stewart, Esq. of Physgill; Alexander Macneill, Esq. Stranraer; and any other Members in the District; five to be a quorum. Mr Cathcart of Genoch, Convener.

FOR THE SIXTH DISTRICT.—The Duke of Hamilton; Captain Fullerton of Kilmichael; Robert Brown, Esq.; John Paterson, Esq.; and any other Members in the District; two a quorum. The Duke of Hamilton, in his absence, his Grace's Factor, Convener.

FOR THE SEVENTH DISTRICT.—The Marquis of Breadalbane; the Earl of Ormelie; Lord John Campbell; Sir Duncan Campbell of Barcaldine, Bart.; General Campbell of Lochnell; General Campbell of Monzie; Robert Campbell, Esq. of Ardehatten; Charles Campbell, Esq. of Combie; Donald Campbell, Esq. of Dunstaffnage; Robert Campbell, Esq. of Sonachan; Colin Campbell, Esq. of Ballyveolan; Captain Macdougall of Macdougall, R. N.; Dugald Macdougall, Esq. of Gallinich; Allan Macdougall, Esq. W. S.; and any other Members in the District; five a quorum. Lochnell, in his absence, Mr Macdougall of Gallinich, Convener.

FOR THE EIGHTH DISTRICT.—Lord Abercromby; Lord Moncreiff; the Hon.^o Colonel Abercromby; Count Flahault; Sir Gilbert Stirling, Bart.; Robert Bruce, Esq. of Kennet; Robert Clark, Esq. of Comrie; James Erskine, Esq. of Aberdona; R. Wardlaw Ramsay, Esq. of Tillicoultry; Thomas Graham Stirling, Esq. of Airth; James Johnston, Esq. of Alva; Craufurd Tait, Esq. of Harviestoun; Alex-

ander Macfarlane, Esq. of Thornhill; John Moubray, Esq. of Cambus; John Philp, Esq. at Dolls; and any other Members in the District; three a quorum. Lord Abercromby, in his absence Mr Bruce of Kennet, Convener.

FOR THE NINTH DISTRICT.—The Duke of Montrose; the Marquis of Graham; Lord Montagu William Graham, M. P.; Sir Archibald Campbell, Bart.; R. C. Bontine, Esq. of Ardoch; John Cross Buchanan, Esq. of Auchintoshan; John Buchanan, Esq. of Carbeath; John Buchanan, Esq. of Ardoch; John Buchanan, Esq. younger of Ardoch; Archibald Buchanan, Esq. of Auchintorlie; P. Buchanan, Esq. of Auchmar; J. C. Colquhoun, Esq. of Killermont; Samuel Cooper, Esq. of Ballindalloch; James Dennistoun, Esq. of Dennistoun; J. Dennistoun, Esq. younger of Dennistoun; J. M. Gartshore, Esq. of Gartshore; W. Dunn, Esq. of Kilbowie; W. C. C. Graham, Esq. of Gartmore; John Graham, Esq. younger of Ballagan; General Graham Stirling, of Duchray; J. R. Smollett, Esq. of Bonhill; George Buchanan, Esq. of Finnich-Malise; John Buchanan, Esq. at Finnich; R. Macgown, Esq. of Mains; John MacAdam, Esq. of Blairover; John MacInnes, Esq. of Auchinfroe and Woodburn; James Graham, Esq. of Leitchtown; Stewart Jolly, Esq.; and any other Members in the District; five a quorum. The Duke of Montrose, in his absence his Grace's Factor, Convener.

FOR THE TENTH DISTRICT.—The Earl of Kintore; Viscount Arbuthnot; General the Honourable H. Arbuthnot, M. P.; Sir Alexander Ramsay, of Balmain, Bart.; Captain Thomas Ramsay; Thomas Burnett, Esq. younger of Leys; R. Barclay Allardice, Esq. of Ury; General Burnett, of Banchory-Lodge; Alexander Crombie, Esq. of Phesdo; R. W. Duff, Esq. of Fetteresso; R. Duff, Esq. younger of Fetteresso; Arthur Duff, Esq. of Cocklaw; George Douglas, Esq. Sheriff of the County; John Burnett, Esq. of Kemnay; Sir Alexander Keith, K. M.; George Robertson Scott, Esq. of Benholm; James Scott, Esq. of Brotherton; Major-General Straton, of Kirkside; William Shand, Esq. of Arnhall; Henry Lunsden, Esq. of Tilwhilly; William Stewart, Esq. Sheriff-Clerk of the County; and any other Members in the District; three a quorum. Lord Arbuthnot, in his absence Captain Ramsay, Convener.

FOR THE ELEVENTH DISTRICT.—The Duke of Gordon; the Earl of Aboyne; the Earl of Fife; Sir Charles Forbes, Bart. M. P.; Colonel Sir Alexander Leith, of Freefield; John Forbes, Esq. M. P.; Charles Forbes, Esq. of Asloun; George Forbes, Esq. of Auchnagathil; Major-General Forbes of Auchernach; Major Anderson of Candacraig; James Farquharson, Esq. of Invercauld; Archibald

Farquharson, Esq. of Finzean; the Rev. Dr Forbes of Blelack; Charles Gordon, Esq. of Wardhouse; J. D. Gordon, Esq. younger of Wardhouse; Michael Gordon, Esq. of Abergeldie; H. Leith Lumsden, Esq. of Auchindoir; Benjamin Lumsden, Esq. of Kingsford; John Roy, Esq. Factor on the Estate of Invercauld; Mr Grassick, Glenbucket; Mr Stewart, Balletrach; Mr Grassick Bucham; and any other Members in the District; four a quorum.—John Forbes, Esq. M. P., in his absence Dr Forbes of Blelack. Convener.

FOR THE TWELFTH DISTRICT.—The Earl of Aberdeen; Lord Saltoun; Sir John Stewart Forbes, Bart.; Sir Charles Forbes, Bart. M. P.; John Forbes, Esq. M. P.; Charles Forbes, Esq. of Asloun; George Forbes, Esq. of Auchnagathil; George Ferguson, Esq. of Pitfour; Michie Forbes, Esq. of Crimond; Colonel Gordon of Cluny, M. P.; T. A. Fraser, Esq. of Lovat and Strichen; Garden Duff, Esq. of Hatton; James Ferguson, Esq. of Kinnmundy; John Gordon, Esq. of Cairnbulg; Thomas Gordon, Esq. of Buthlaw; Charles Gordon, Esq. younger of Auchluchries; Alexander Forbes Irvine, Esq. of Chivas; J. W. Mackenzie, Esq. of Pitrichie; John Turner, Esq. of Turnerhall; Charles Bannerman, Esq. of Crimonmogate; Robert Hutchison, Esq. younger of Cairngall; Thomas Arbuthnot, Esq. of Meethall; Roderick Gray, Esq. Peterhead; and any other Members in the District; five a quorum.—Lord Saltoun, in his absence Mr Ferguson of Kinnmundy, Convener.

FOR THE THIRTEENTH DISTRICT.—The Duke of Gordon; the Earl of Fife; Major Taylor, Rothiemay; General Hay of Rannes; Lieutenant-Colonel Leith Hay, younger of Rannes; John Morrison, Esq. of Auchintoul, M. P.; H. Leith Lumsden, Esq. of Auchindoir; Patrick Stewart, Esq. of Auchlunkart; Major Stewart, Pittyvaich; George Gordon, Esq.; John Stronach, Esq. Factor for the Earl of Fife; and any other Members in the District; three a quorum.—The Duke of Gordon, in his absence Mr Gordon, to be Convener.

For the Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, and Nineteenth Districts, the Judges and Conveners remain as intimated last year, with the addition of those resident Members who have been since elected.

RULES OF COMPETITION.

1. The Conveners, with the approbation of a quorum of the Committee for conducting the several competitions, are respectively authorized, in such cases as they shall see proper, to divide the two premiums allowed for Bulls into three premiums, in such proportions as they shall approve, the first premium for bulls not being less than Eight Sovereigns; and, in like manner, to divide the sums al-

lowed for Queys into three premiums, fixing their amount. In Shetland, the Committee are empowered to divide the premiums for Bulls into four, the first not being under Six Sovereigns; and for Queys also into four, the first not being under Three Sovereigns.

2. The Committee shall not place for competition any stock which, in their opinion, does not fall within the regulations prescribed, or does not possess merit, and in no instance shall any of the money premiums be awarded, where there are not, after such selection, at least three competitors, reserving to the Committee, in the case here provided for, to make such allowance to a party showing stock of merit, not exceeding half the amount of the premium, as, under the circumstances, they may think reasonable.

3. The times and also the places of competition are to be fixed by the Conveners, with the advice of at least a quorum of their respective Committees, and the competitions are to take place between the 20th July and the 1st day of November next.

4. The Convener of each Committee will give timely notice to the other Members of the Committee, of the place and time of the competition, and will be particularly careful, that the same be intimated at the several parish church doors within the district for at least two successive Sundays previous to the competition.

5. As these premiums were given, in some of the above-mentioned districts in 1827, 1828, 1829, 1830, and also in 1831, it is to be observed that the Society does not admit an animal, in any class of stock, which may have gained a first premium at a District or General Show, in a former year, to be again shown in competition in any district; and for no description of stock shall either the same or a lower denomination of premium be awarded, in the district in which they have already gained a premium. In those districts where the honorary Silver Medal is offered for bulls, tenants cannot compete, with the same animal, both for the honorary and the money premiums.

6. No Member of the Committee, showing stock of his own at the competition, shall act as Judge, nor shall Factors, when they are Members of the Society, and are named on the Committee, or when acting in the absence of proprietors, compete for premiums in the district, in which they are so named or act, in those districts and classes, in which proprietors are excluded from competition. In all cases, the bulls, for which premiums are awarded, must have served, or shall be kept to serve the district, for at least one season, at a moderate charge for each cow, and the rate may be fixed by the Committee. The same person is not to obtain more than one of the premiums for bulls, nor more than one of the premiums for queys, in one year, except in those districts where tenants compete for the honorary and money premiums for bulls, in which case they may, with different animals, carry the medal and one of the money premiums.

7. In order to entitle the competitors to their respective premiums, a regular report, signed by the Convener, and at least a majority of the Committee who attend the competition, must be transmitted by the Conveners, so as to be received by the Secretary on or before the 10th of December next, and which re-

port must specify the ages of the bulls and queys preferred; the length of time the bulls have been in the possession of the competitors, and, with respect to the queys, that they were bred by the competitors, and were their property on the day of competition; the number of bulls and queys respectively produced thereat; the number placed for competition in each class; the names and designations of the persons to whom the premiums have been adjudged; amount of premiums voted to each; and, in general, that all the rules of competition fixed by the Society, as above-mentioned, have been strictly observed; and, in particular, that the previous intimations to the Committee of Judges, and advertisements at the church doors, were regularly made as required. In case all the Members of the Committee who may have attended shall not have subscribed the report, the Convener will mention the cause which may have prevented their doing so.

Further, it is to be distinctly understood, that in no instance does any claim lie against the Society for expenses attending a show of stock, beyond the amount of the premiums offered.

With reference to the competitions in the 2d, 3d, 6th, 7th and 18th districts, the reports must bear, that the bulls and queys preferred were of the West Highland breed; in the 5th, of the Galloway breed; in the 17th, of the Ayrshire Dairy; and in the 14th, that the bulls were of the pure short-horned breed.

Conveners are requested to get the reports drawn up and signed by a majority of the Committee present at the competition, before they separate.

NOTE.—The Society, being impressed with the benefit to be derived from continuing these competitions in the same districts for a longer period than had formerly been the practice, proposes to offer them in the districts Nos. 17, 18, and 19 (in which 1831 was the first year's competition of the series), for the years 1833 and 1835, and, provided the gentlemen of the district, or any local association therein, shall continue the competition and award premiums in the district, to the amount of not less than one-half of the Society's premiums, and for the same description of stock, during the intermediate years 1832 and 1834, the Society will continue its premiums to the districts in the year 1836. The same provisional continuance for the year 1832 was intimated in 1827, with reference to the districts Nos. 1, 2, 3, and 4, in which 1827 was the first year of competition, and the premiums are accordingly this year given in these districts; a similar intimation of provisional continuance for 1833 was made in 1823 for the districts Nos. 5 and 12, both inclusive, in which 1823 was the first year of competition; for 1834, for the districts Nos. 14, 15, and 16, in which 1829 was the first year of competition; and the like provisional continuance for 1835 was made last year for No. 13, in which 1830 was the first year of competition. A certificate of the competition and premiums awarded at the two intermediate local shows, signed by at least two Members of the Society, must be transmitted to the Secretary of the Society, so as to be received by him on or before the 10th December in each year, in order to entitle the districts to any claim for the additional year's premiums.

§ II. SHEEP AND WOOL.

1. PREMIUMS FOR IMPROVING THE BREED OF SHEEP IN THE FOLLOWING DISTRICTS.

1. *The District of Cowal, Argyllshire.*
2. *The following Parishes in the Counties of Mid-Lothian, Selkirk, Roxburgh, Peebles, and Dumfries, viz. Stow, Galashiels, Selkirk, Ettrick, Yarrow, Robertson, Ashkirk, Hawick, Melrose, Cavers, Eskdale Muir, Manor, Tweedsmuir, Lyne and Megget, Traquair, Innerleithen, and Peebles.*
3. *The Countries of Glengarry, Abertarf, Stratherrick, and the Parish of Urquhart in Inverness-shire, including the lands of Aberchalder, and Dumnaglass, partly in Nairnshire.*
4. *The Isle of Skye, in Inverness-shire.*
5. *The District of Forfarshire, called the Braes of Angus, comprehending the Parishes of Glenisla, Lintrathon, that part of the parish of Kirriemuir designated Glenprosen, the United Parishes of Cortachy and Clova, Glenmoy and Glenogle (being the pasture part of the parish of Tannadice), the parishes of Lochlee, Edzell, Lethnot, and Menmuir.*
6. *The Parishes of Assynt, Tongue, Duriness, and Edrachilles, including the Grazings of Invercashly and Shiness, in the County of Sutherland.*
7. *The Parishes of Applecross, Lochcarron, Lochalsh, Kintail, Glen-shiel, and Glenelg, in the Counties of Ross and Inverness.*

For the best Pen of eighteen Gimmers or Ewes of the Black-faced breed, from sixteen to twenty months old, the property of any proprietor or tenant within the First and Seventh Districts, and which shall be certified at the respective competitions to have been at least one year in his possession, and to have been, during that year, grazed on the same kind of pasture with the remainder of the flock of like age—Ten Sovereigns.

For the second best Pen as aforesaid—Seven Sovereigns.

For the third best Pen as aforesaid—Three Sovereigns.

For the best Pen of fifteen Cheviot Gimmers, in the Second District, bred by any Proprietor or Tenant upon moist grassy lands, according to the division of farms made by the Pastoral Society of Selkirkshire—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

For the best Pen of fifteen Cheviot Gimmers, in the Second District, bred by any Proprietor or Tenant upon dry heathy lands,

according to the division of farms made by the Pastoral Society of Selkirkshire—Ten Sovereigns.

For the second best Pen of ditto—Five Sovereigns.

For the best Pen of fifteen two-year old Cheviot Ewes, the property of any Proprietor or Tenant within the Third District, and which shall be certified at the competition to have been at least one year in his possession—Eight Sovereigns.

For the second best Pen, certified as aforesaid—Four Sovereigns.

For the best Pen of fifteen Cheviot Gimmers, in the Third District—Seven Sovereigns.

For the second best ditto—Four Sovereigns.

For the best Pen of eighteen Gimmers, or Ewes, of the Black-faced breed, from sixteen to twenty months old, the property of any Proprietor or Tenant within the Fourth and Fifth Districts, and which shall be certified at the respective competitions to have been at least one year in his possession, and to have been, during that year, grazed on the same kind of pasture with the remainder of the flock of like age—Ten Sovereigns.

For the second best Pen, as aforesaid—Seven Sovereigns.

For the third best Pen, as aforesaid—Three Sovereigns.

For the best Pen of fifteen Cheviot Gimmers, or one year old Ewes, the property of any Proprietor or Tenant within the Sixth District, and which shall be certified to have been at least twelve months in his possession—Ten Sovereigns.

For the second best Pen, certified as aforesaid—Five Sovereigns.

For the third best Pen, certified as aforesaid—Three Sovereigns.

The Premiums in the First and Second Districts were offered for the first year in 1827, and the districts having awarded Premiums in the intermediate years, 1828 and 1830, those for the additional year provisionally offered by the Society are now given. In the Third and Fourth Districts, Premiums were given by the Society in 1828 and 1830. In the Fifth District, Premiums were offered in 1830 for the first year; they will be again given there in 1834, and their continuance for an additional year will be dependent on the circumstance of the resident gentlemen, or any local association, having awarded premiums in the two intermediate years 1831 and 1833. In the Sixth District, the Premiums given in 1831 will be renewed in 1833, and provisionally also for 1834; and in the Seventh District, the Premiums given in 1831, for the first year, will be renewed for 1833 and 1835; and provisionally also for 1836, if they shall have been continued in the District during the intermediate years 1832 and 1834.

The following Members of the Society are appointed Committees for awarding the Premiums for Sheep in the five first Districts :

FOR THE FIRST DISTRICT—Kirkman Finlay, Esq. of Castle Toward ; Robert Maclachlan, Esq. of Maclachlan ; Mungo N. Campbell, Esq. of Ballimore ; Archibald Campbell, Esq. of Drimsynie ; John Campbell, Esq. of Southall ; James Finlay, Esq. younger of Castle Toward ; Alexander Lamont, Esq. of Knockdow ; James Ewing, Esq. of Dunoon Castle ; Angus Fletcher, Esq. of Dunans ; Archibald Campbell, Esq. of Glendaruel ; John Campbell, Esq. of Strachur ; George Wilson, Esq. of Innisnarnisk ; James Hunter, Esq. of Halfton ; John Fletcher, Esq. of Bernice ; James Lamont, Esq. ; Mr Macfarlane, Strachurmore ; and any other Members in the district, five a quorum. Drimsynie and Maclachlan, or either of them, to be Conveners, in their absence, Mr Lamont of Knockdow.

FOR THE SECOND DISTRICT—The Duke of Buccleuch ; the Earl of Traquair ; Lord Napier ; Lord Montagu ; Sir Thomas Gibson Carmichael, Bart. ; Sir John Hay, Bart. M.P. ; Sir Walter Scott, Bart. ; W. Elliot Lockhart, Esq. of Borthwickbrae ; Allan Elliot Lockhart, Esq. younger of ditto ; John Borthwick, Esq. of Crookston ; Gilbert Innes, Esq. of Stow ; R. N. Campbell, Esq. of Kailzie ; W. F. Mackenzie, Esq. of Portmore ; James Pringle, Esq. of Torwoodlee ; John Boyd, Esq. of Broadmeadows ; John C. Scott, Esq. of Sinton ; John Pringle, Esq. of Clifton ; Captain James Pringle, younger of Torwoodlee ; Alexander Pringle, Esq. of Whytbank, M. P. ; Mark Sprot, Esq. of Riddell ; Lieutenant-Colonel J. Fergusson of Huntlyburn ; William Ogilvie, Esq. of Chesters ; William Allan, Esq. of Glen ; Thomas Macmillan, Esq. of Shorthope ; Charles B. Scott, Esq. of Woll ; Archibald Douglas, Esq. of Adderstone ; Thomas Bruce, Esq. of Langlee ; Thomas Stavert, Esq. of Hosecoat ; Mungo Campbell, Esq. of Hallyards ; and any other Members in the district ; five a quorum. Lord Napier—in his absence, Mr Pringle, M. P. to be Convener.

FOR THE THIRD DISTRICT.—Colonel the Hon. F. W. Grant, M. P. ; J. M. Grant, Esq. of Glenmorrison ; James Grant, Esq. of Corrymony ; Patrick Grant, Esq. of Lakefield ; Simon Fraser, Esq. of Foyers ; A. T. F. Fraser, Esq. of Abertarf ; J. L. Macgillivray, Esq. of Dunnaglass ; Gordon Cameron, Esq. of Letterfinlay ; James Grant, Esq. W. S. ; and any other Members in the district ; two a quorum. Mr Grant of Glenmorrison—in his absence, Mr Fraser of Abertarf, to be Convener.

FOR THE FOURTH DISTRICT.—Lord Macdonald ; the Right Hon. C. Grant, M. P. ; J. N. Macleod, Esq. of Macleod, M. P. ; A. K. MacKinnon, Esq. Corry ; Alexander Macalister, Esq. of Strathaird ;

Captain Macaskill, Rudunan ; Captain Macleod, Gesto ; Dr Farquhar Mackinnon ; Neil Mackinnon, Esq. ; the Rev. Mr Mackinnon, Slate ; John Elder, Esq. Slate ; H. P. Macdonald, Esq. Mougstad ; H. Macaskil, Esq. Tallisker ; Donald Macleod, Esq. Claggan ; Alexander Macleod, Esq. Factor for Lord Macdonald ; Edward Gibbons, Esq. Factor for Macleod ; Donald MacLachlan, Esq. Scorrybreck ; William Macleod, Esq. Orbst ; Martin Macleod, Esq. Drynock ; five a quorum. Lord Macdonald and Mr Macleod of Macleod, and their Factors, in their absence, Conveners.

FOR THE FIFTH DISTRICT.—The Earl of Airlie ; the Earl of Fife ; Lord Panmure ; Colonel the Hon. D. Ogilvy of Clova ; Captain the Hon. W. Ogilvy, Airlie Castle ; Sir James Ramsay, Bart. of Bamff ; P. Wedderburn Ogilvy, Esq. of Ruthven ; John Wedderburn, Esq. ; Alexander Greenhill, Esq. of Fearn ; James Carnegie Arbuthnot, Esq. of Balnamoon ; George Lyon, Esq. of Glenogil ; William D. Proctor, Esq. of Halkerton ; Thomas Carnaby, Esq. Forfar ; three a quorum. The Earl of Airlie to be Convener.

The Judges for the Sixth and Seventh Districts were intimated last year.

RULES OF COMPETITION.

The Competition for the Premiums in the five first Districts will take place on such days, between the 20th of July and 1st November 1832, as shall be fixed by the Conveners, with the advice of a quorum of their respective Committees ; and the Conveners, with the same advice, will also fix the places of competition for these districts. The Committees, in deciding the Premiums for Sheep, will have regard both to the wool and carcass of the animal. The Regulations for Cattle Shows, in regard to fixing the Competition—the previous intimations to Members of the Committee and Competitors—the placing of the Stock, and the number of Competitors required for competition—the power to make provisionally an allowance for Stock of merit, in the event of deficiency in number—authority to divide the three Premiums in the first, fourth, fifth, sixth, and seventh districts, into four—the first Premium, in either, not being under Eight Sovereigns—the rules as to awarding first and second Premiums, and prohibiting Members acting as Judges, who are also Competitors ; the regulations relating to extra expenses, and the manner in which the reports are to be certified and transmitted, are severally hereby declared to be applicable to the Premiums for Sheep.

The Sheep exhibited for the Premiums in the second district must be certified, to the satisfaction of the Committee, to have been selected from hirsels consisting of at least fifty, and in the sixth district from a hirsle not less than one hundred, of the same kind and age ; that such hirsle has not been, at any time, selected from the rest of the Competitor's stock, or reared from a hirsle of selected ewes ; that the hirsle has not, at any time, been fed on turnips or other green crop, nor upon artificial grasses, nor differently treated from the whole stock of the respective ages belonging to the Competitor, it being the object of the Society to award these Premiums for Cheviot Sheep reared exclusively upon hill pastures.

The Note annexed to the Rules of Competition for the Premiums for Cattle, is applicable also to the Districts for Sheep, in which the Premiums will be continued by the Society for an additional period, on the conditions specified in the said note.

§ III. WORK HORSES.

PREMIUMS FOR IMPROVING THE BREED OF DRAUGHT HORSES.

1. *The County of Ayr.*
2. *The Islands of Shetland.*
3. *The County of Caithness.*

For the best Stallion, from three to twelve years old, for the improvement of the Breed of Draught Horses within the first district, kept to serve in the county of Ayr, and for this purpose to be shown at Kilmarnock, Mauchline, Ayr, and Maybole, at such times as the Members of the Society, resident in the county, may fix, at a meeting to be intimated by the Convener for the purpose, from 1st April to 1st August 1832—Ten Sovereigns.

For the best Mare for breeding Draught Horses, which shall have had at least one foal, *bona fide* the property and in possession of any tenant in the said district, from 1st January 1832 to the day of competition—Eight Sovereigns.

For the best three year old Gelding or Filly, *bona fide* the property of and bred by any tenant in said district—Five Sovereigns.

The sum of Ten Sovereigns will be placed at the disposal of the Committee of the Society's Members in the Shetland Islands, to be applied by them in such proportions, and under such regulations, as they may fix, at a meeting to be called by the Convener for the purpose, in Premiums for Stallions and Mares, of the description best adapted for agricultural purposes in these islands.—The competition to take place in 1832.

For the best Stallion of the age and description as above specified for the first district, kept to serve in the county of Caithness, and for this purpose, to be shewn at Wick, Thurso, Dunbeath, and Reay, at such times, from 1st April to 1st August 1833, as the Members of the Society resident in the county shall fix, at a meeting to be intimated by the Convener, for the purpose—Ten Sovereigns.

For the best Mare for breeding Draught Horses, which shall have at least one foal, *bona fide* the property and in possession of any tenant in the third district, from 1st January 1833 to the day of competition.—Eight Sovereigns.

For the best three year old Gelding or Filly, *bona fide* the property of and bred by any tenant in said district—Five Sovereigns.

RULES OF COMPETITION.

The time and place of competition for the premiums are to be fixed by the Convener, with the concurrence of at least a quorum of the respective Committees, and are to be published by the Convener at the church doors in due time, or in such other manner as shall be thought by him and a quorum of the Committee effectual for the information of those interested.

The competition to take place in the first and second districts betwixt 1st April and 1st August 1832, and in the third district within the same period in 1833. The regulations for Cattle Shows in regard to fixing the competition—the previous intimation to Judges and Competitors—the power of the Judges to withhold the premiums, if the animals produced shall be of inferior character—those relating to extra expenses—and against Competitors being also Judges—and the manner in which the reports are to be certified and transmitted to the Society, are severally hereby declared applicable to the premiums for horses.

The premiums will be continued in the first district for 1834, and in the third district for 1835, provided premiums for the same description of stock, to an amount not less than one-half of those offered by the Society, are awarded by the resident gentlemen, or by local associations, in the intermediate years 1833 for the first district, and 1834 for the third district. Reports of these intermediate local shows, signed by at least two members of the Society, to be transmitted to the Secretary of the Society, on or before the 10th of December in each year, in order to entitle the districts to any claims for the additional year's premiums.

The members of the Society in the several districts are appointed Committees for regulating every thing relative to the Competitions, with power to name Sub-Committees of their number for attending to the necessary details.

FOR THE FIRST DISTRICT,—John Ferrier Hamilton, Esq. of Westport, one of the Directors of the Society, Convener of the Committee of resident members; three a quorum.

FOR THE SECOND DISTRICT,—William Mowat, Esq. of Garth, Convener of the Committee of resident members; two a quorum.

FOR THE THIRD DISTRICT,—James Traill, Esq. of Ratter; in his absence William Horne, Esq. of Scouthel, Convener of the Committee of resident members; three a quorum.

§ IV. SWINE.

DISTRICT.—*The Counties of Aberdeen and Kincardine.*

For the best Boar, not under twelve months, nor exceeding four years old, *bona fide* the property and in possession of any proprietor or tenant in the counties of Aberdeen and Kincardine in autumn 1832—Seven Sovereigns.

For the second best—Three Sovereigns.

For the best Breeding Sow, of the same age—Four Sovereigns.

For the second best—Two Sovereigns.

These Premiums to be awarded for animals that are considered most profitable and best suited for the purpose of curing Mess Pork. Attention is strongly recommended to the introduction of the Berkshire or Suffolk breed of swine, as being the best for curing pork.

The Competition is to be held at such time and place as the Society's members resident in the county shall fix, at a meeting to be intimated by the Convener for the purpose. This meeting is also authorised to name a Committee for managing all details, and to fix the necessary regulations for competition. A report of the award of the premiums, with a copy of the regulations of competition, to be transmitted to the Secretary on or before 10th December 1832. Sir R. D. Horne Elphinstone, Bart. in his absence, Alexander Thomson, Esq. of Banchory, to be Convener.

These premiums will be again offered in the same district in 1834, provided the gentlemen of the district, or any local association, shall award the same description of premiums in the intermediate year 1833. A report of the award of the local premiums, signed by at least two members of the Society, to be transmitted to the Secretary of the Society, on or before the 10th of December 1833.

CLASS V.

PRODUCTS OF LIVE STOCK.

§ I. CURING BUTTER.

DISTRICT.—*The Parishes of Kirkmichael, Inveravon, Aberlour, Mortlach, Botriphnie, and Boharm, in Banffshire, and of Rothies and Knockando, in Elginshire.*

The Premiums given, and regulations suggested, for promoting an improved system of Curing Butter, having been productive of highly satisfactory results, the following Premiums are offered in the district above described.

To the owner of any Dairy in the above district who shall make and cure the best quality of Butter for the market, not being less than five cwt. (112 lb. to the cwt. of 16 oz. to the lb.) during the season 1832—Eight Sovereigns.

For the second best quality, as aforesaid—Five Sovereigns.

For the third best quality, as aforesaid—Four Sovereigns.

For the fourth best quality, as aforesaid.—Three Sovereigns.

CONDITIONS.

The Butter must be certified on oath to have been made and cured on the competitor's farm, during the season 1832; and the affidavit must bear that the sample of one or more kits or firkins produced is a fair average of the quantity made and cured as aforesaid. It shall be inspected by a Committee of the Members of the Society resident within the district, at a meeting to be called by the Conveners for that purpose, at Charlestown of Aberlour, on such days as the Conveners may appoint. In the event of two or more competing lots being deemed equal in quality, the premium will be awarded to the larger quantity. Although not required as a condition, it is strongly recommended, as affording facilities for sales, that the Butter should be packed in firkins containing 56 lb. each. The successful candidates, before receiving the premiums, are required to transmit to the Secretary a detailed report of the whole process followed by them in the manufacture of their Butter. A report of the award of the premiums to be lodged with the Secretary of the Society, on or before the 10th December 1832. G. Macpherson Grant, Esq. of Ballindalloch; in his absence, R. Wharton Duff, Esq. of Orton, and P. Stewart, Esq. of Auchlunkart, to be Conveners.

The Convener has undertaken, on application to him, to furnish intending Competitors with a copy of Observations on Making, Curing, and Casking of Butter.

§ II. MAKING CHEESE.

1. IMITATION OF ENGLISH CHEESE.

DISTRICTS.

1. *The County of Wigton.*
2. *The County of Argyll.*

The sum of Fifteen Sovereigns will be placed at the disposal of Members of the Society, in *each* of the above districts, Five Sovereigns more being provided by each of the counties, or by any local association therein, to be divided and apportioned in such manner as to the respective Committees shall seem best, for the improvement of Cheese-making in the said districts in 1832, under the regulations after mentioned.

CONDITIONS.

The Cheese shall be made to resemble Stilton, Double Gloucester, or North Wiltshire, and the whole quantity made by each competitor shall not be less than one cwt. (112 lb. of 16 oz.) A certificate on

oath to be lodged with the Convener of the Committee, that two or more cheeses to be produced are a fair average sample of the kind competing, made in that year by the competitor, and one of the cheeses of the successful specimens shall be transmitted to the Secretary for the inspection of the Society.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies if he thinks proper; and the successful competitors, before receiving payment of their premiums, are required to transmit to the Secretary a detailed report of the whole process employed by them in the manufacture of their cheese, noticing the quantities of sweet milk cheese made by them, the object being not to produce a few superior cheeses, but to improve the system, which, in some districts of Scotland, where premiums have been given, has been found to have attained great perfection,—as well as to ascertain the general quantity of superior sweet milk cheese to be procured from the district competing. The cheeses to be examined and the premiums awarded by the local Committee, at such place as the Society's Members shall appoint, at a meeting to be intimated by the Convener for that purpose, and which meeting shall also name a Committee for fixing such farther regulations as may be necessary, and arranging all details. A report of the award of the premiums to be transmitted to the Society, on or before the 10th December 1832.

The following members of the Society are named Conveners of the resident members, viz. :—

John Cathcart, Esq. of Genoch, for Wigtonshire; and Robert Maclachlan, Esq. of Maclachlan, for the county of Argyll.

2. SKIM-MILK CHEESE.

The Society being of opinion that in districts where butter is the staple produce of the dairy, cheese made from skimmed milk may be so improved in quality as to be brought into successful competition with Dutch cheese, a large quantity of which, from the same material, is annually imported into this country, have resolved to offer district premiums for this object.

DISTRICTS.

1. *The County of Aberdeen.*
2. *The County of Dumfries.*

To the owner of any Dairy, in each of the said districts, who shall make for sale the best quality of cheese, from skimmed milk, not being less than one cwt. (112 lb. of 16 oz.) during the season 1832—Eight Sovereigns.

For the second best quality as aforesaid—Five Sovereigns.

For the third best quality as aforesaid—Two Sovereigns.

In the event of two or more competing lots being deemed equal in quality, the premiums to be awarded to the greater quantity, and one of the cheeses of the successful specimens shall be transmitted to the Secretary, for the inspection of the Society. The cheese must be certified on oath to have been made during the season 1832, from skimmed milk, without any admixture of cream, and that the samples of two cheeses or more to be produced, are a fair average of the produce of the Dairy.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies, if he thinks proper; and the successful candidates, before receiving their premiums, are required to transmit to the Secretary a detailed account of the whole process followed by them in the manufacture of their cheese. The cheeses to be inspected at such place as the Society's members shall fix, at a meeting to be intimated by the Convener for that purpose, and which meeting shall also name a Committee for fixing such farther regulations as may be necessary, and managing all details. Sir R. D. Horne Elphinstone, Bart. Convener for the county of Aberdeen, and J. J. Hope Johnstone, Esq. of Annandale, M. P. Convener for the county of Dumfries. A report of the award of the premiums to be transmitted to the Society on or before the 10th December 1832.

CLASS VI.

COTTAGES.

1. PREMIUMS IN MONEY TO COTTAGERS FOR THE CLEANEST KEPT COTTAGES.

DISTRICTS.

1. *The County of Banff.*
2. *The County of Ayr.*
3. *The County of Aberdeen.*
4. *The County of Bute and Arran.*

In order to excite the attention of cottagers to keeping their cottages neat and clean, Ten Premiums of Two Sovereigns each, will be awarded to Ten Cottagers in each of the above districts, paying L. 5 of rent or under—or whose cottage and land annexed

to it does not exceed that annual value—who shall be certified by two members of the Society, resident in the district, or by one member of the Society and the clergyman of the parish, to have been distinguished for the general neatness and cleanliness of the interior as well as exterior of his or her cottage (including the garden, should there be one attached to it), and to be deserving, on that account, of this mark of the Society's approbation.

CONDITIONS.

The certificate must bear that the cottage has been personally inspected by the parties granting it, and must give some description of the merits of the cottager in respect of the manner in which the cottage as well as the immediately adjoining space have been kept, specifying, at the same time, the name, designation, and residence of the competitor. For the First and Second Districts, the certificates must be transmitted to the Secretary of the Society on or before the 10th of November 1832, and for the Third and Fourth, on or before the 10th November 1833.

Should there be more than ten competitors in each district, the Society will be influenced by the circumstances of the case in deciding what claims are to be preferred; but, in every case, their decision will have regard exclusively to the neatness and cleanness with which the cottage and immediately adjoining space have been kept, and not to the construction of the cottage, or to the materials of which it is composed.

2. MEDALS TO COTTAGERS.

In the view of giving still farther encouragement to Cottagers of the above description, who do not reside in the counties in which the regular premiums are in operation at the time, and, at the same time, of giving aid to local associations and public spirited individuals, establishing or continuing, at their own expense, premiums for the like object, the Society have assigned six Cottage Medals annually to such associations or public spirited individuals as apply for the same, and may be desirous to add that testimony of approbation to such premiums as they themselves bestow. Applications for these medals must be accompanied by a report, certified in the terms required by the preceding conditions, describing the merits of the cottager, and the nature of the encouragement which has been afforded by the parties applying.

3. MEDALS FOR VILLAGES.

As it is desirable to excite a similar spirit of improvement among the working classes in villages, having a population under 500 persons, and where there is no established system of police, the Society is ready to grant Medals annually to any benevolent association wishing to co-operate with the Society, in the important design of promoting greater attention to cleanliness and order in any such villages, and to contribute rewards from funds raised in their respective localities. Medals will likewise be placed at the disposal of any two or more members of the Society forming themselves into a Committee for the improvement of a village with which they may be locally connected.

Local Associations or Committees intending to avail themselves of this offer, are requested to transmit a report of their regulations and intended plan of proceedings to the Society, on or before the 1st of July annually, after which they will be informed of the proportion of Medals which the Society can put at their disposal.

Associations or local Committees which may have Medals granted to them, will be required to send an account of their application, with observations on the degree of effect which may appear to have been produced on the habits of competitors.

4. PREMIUMS TO COTTAGES FOR PROMOTING ATTENTION TO THE CULTIVATION AND MANAGEMENT OF BEES.

DISTRICTS.

1. *The Counties of Fife and Kinross.*
2. *The Counties of Inverness, Ross and Cromarty.*

To the Cottager in the first district paying L. 5 of rent, or under, or whose cottage and land annexed to it does not exceed that annual value, who, between 1st June and 1st October 1832, shall have raised the greatest number of Hives of Bees, not fewer than Seven, from stocks of his or her own property, none of the hives weighing under 20 lb., exclusive of the weight of the material of the hive or skep—A Premium of Five Sovereigns.

To the Cottager in the same district who shall have raised the second greatest number, as aforesaid—Three Sovereigns.

To the Cottager in the same district who shall have raised the third greatest number, as aforesaid—Two Sovereigns.

Certificates of the number of Hives, and their several weights, making allowance for the weight of the skeps (which are to be weighed before being used), signed by two Members of the Society, resident in the neighbourhood, or by one Member and the Clergyman of the parish, to be transmitted to the Secretary on or before 10th November 1832.

Similar Premiums will be given in the Second District for Hives raised between the 1st June and 1st October 1833.

CLASS VII.

WOODS AND PLANTATIONS.

1. HONORARY PREMIUM FOR PLANTING.

To the Proprietor who shall communicate to the Society, on or before the 10th of November in any year, a satisfactory Report on the Planting of Land, founded on experiment; and who shall accordingly have planted on his own property an extent of not less than One hundred and fifty acres, within a period of five years preceding the date of his Report—The Gold Medal.

It is required that the report shall relate more especially to the tract of land which forms the subject of the communication, detailing the necessary particulars regarding its soil, climate, and exposure; the kinds, age, and number of the plants used; the mode of planting adopted, and the expenses of the work; and the writer is invited to state those more general observations on the principles and practice of planting which his knowledge and experience on the subject may enable him to communicate.

2. RAISING THE *PINUS SYLVESTRIS* FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between the 30th October 1830 and 30th October 1833, have raised, on rather poor nursery-ground, and sold for planting, the greatest number of plants, not fewer than Three Millions, of the *Pinus sylvestris*, from seed imported from Norway, and taken off healthy trees in that country, or taken off healthy and free growing trees of the natural grown Pine in the Highland Districts of the counties of Aberdeen, Moray, and Inverness—Fifteen Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before 10th November 1833, affidavits in support of the collec-

tion of the seed, specifying the quantity, and the district in which it was collected, with certificates, signed by two Members of the Society, specifying the soil and thriving state of the plants in the nursery ground, and an affidavit of the number of plants sold, to be planted out for timber, and to whom they are disposed of. Competitors are requested to attend to a paper on the Varieties of *Pinus sylvestris*, by the late Mr Dou of Forfar, published in the Memoirs of the Caledonian Horticultural Society, vol. i. p. 121.

3. RAISING LARCH FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between 30th October 1830 and 30th October 1833, have raised and sold for planting the greatest number of plants, not being fewer than One Million, of the *Pinus Larix*, or Larch Fir, from Seed imported from the Tyrol, or other regions of the Alps, to which it is indigenous, and taken off healthy trees in the country—Thirty Sovereigns, or a piece of Plate of that value.

Certificates, similar to those for the *Pinus sylvestris*, to be transmitted on or before the 10th November 1833.

CLASS VIII.

IMPLEMENTS OF HUSBANDRY, AND USEFUL MACHINES.

To the person who shall invent or improve any Instrument or Machine applicable to Husbandry or Rural Economy, and which, from its utility in saving labour or expense, simplicity or cheapness of construction, or other circumstances, shall be deemed by the Society deserving of public notice—The Silver Medal, or such sum in money as the communication shall appear to deserve.

The account of the implement must be accompanied by a model made according to a definite scale, to be deposited in the Society's Museum. The model to be of sufficient dimensions, formed of wood or metal; and the notice or description transmitted with it must specify, according to the best of the inventor's abilities, the purpose for which his invention or improvement is designed.

CLASS IX.
GENERAL SHOW OF LIVE STOCK

AND

AGRICULTURAL MEETING AT KELSO IN 1832.

The Society having resolved to continue a General Show of Live Stock, and an Exhibition of Implements and Roots and Seeds for Agricultural purposes, and having fixed the meeting to be held at Kelso in the present year, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Union Agricultural Society, and other local associations, and from the Noblemen and Gentlemen of the Counties more immediately connected with the Show.

The Stock to be shown to be reared and fed by Proprietors or Tenants IN ANY PART OF GREAT BRITAIN, and to be *bona fide* the property of the Exhibitors.

§ I. CATTLE.

SHORT-HORN BREED.

CLASS I. For the best Bull of the Pure Short-horn Breed, not exceeding four years old—Fifty Sovereigns.

For the second best ditto—Forty Sovereigns.

For the third best ditto—Thirty Sovereigns.

It is a condition attached to the above Premiums, that the Exhibitor shall let out the Bull for season 1833, to serve in Scotland, provided a hire be offered equal to the Premium gained, together with the expense of conveyance to and from the hirer's residence, and the keeping of the Bull for the season.

II. For the best Cow of the pure short-horn breed, of any age—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

III. For the best Heifer of the same breed, calved after the 1st January 1830—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

For the third best ditto—Five Sovereigns.

IV. For the best Heifer of the same breed, calved after 1st January 1831—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

V. For the best two Steers of the short-horn breed, shewing

most symmetry, fat and weight, calved after 1st January 1830—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

VI. For the best two Oxen of the short-horn breed, shewing most symmetry, fat and weight, calved after 1st January 1829—Fifteen Sovereigns.

DEVON BREED.

VII. For the best two Oxen of the pure Devon breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Fifteen Sovereigns.

HEREFORD BREED.

VIII. For the best two Oxen of the pure Hereford breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Fifteen Sovereigns.

GALLOWAY BREED.

IX. For the best two Oxen of the Galloway breed, shewing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

AYRSHIRE BREED.

X. For the best two Oxen of the Ayrshire breed, shewing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

ANGUS BREED.

XI. For the best two oxen of the Angus breed, shewing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

WEST HIGHLAND BREED.

XII. For the best two Oxen of the West Highland breed, shewing most symmetry, fat, and weight, calved after 1st January 1828—Ten Sovereigns.

ANY BREED.

XIII. For the best Ox of any breed, pure or cross, shewing most symmetry, fat, and weight—Ten Sovereigns.

§ II. SHEEP.

LEICESTER BREED.

CLASS I. For the best Tup of the improved Leicester breed, of any age—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

II. For the best shearling Tup of the same breed—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

III. For the best pen of five Ewes of the same breed—Five Sovereigns.

IV. For the best pen of Five Gimmers of the same breed—Five Sovereigns.

V. For the best pen of five Dinmonts of the same breed—Five Sovereigns.

CHEVIOT BREED.

VI. For the best three Tups of the Cheviot breed—Ten Sovereigns.

VII. For the best pen of five Gimmers of the same breed—Five Sovereigns.

VIII. For the best pen of five fat Wedders of the same breed, lambd in 1829—Five Sovereigns.

BLACK-FACED BREED.

IX. For the best three Tups of the black-faced breed—Ten Sovereigns.

X. For the best pen of five Gimmers of the same breed—Five Sovereigns.

XI. For the best pen of five fat Wedders of the same breed, lambd in 1828—Five Sovereigns.

CROSS BREED.

XII. For the best pen of five fat Wedders of any cross—Five Sovereigns.

§ III. HORSES.

CLASS I. For the best Stallion of the Clydesdale breed, not exceeding eight years old—Twenty Sovereigns.

II. For the best Stallion of the Cleveland breed, not exceeding eight years old—Twenty Sovereigns.

The Exhibitor shall be obliged to let out the Horse for season 1833, to serve in Scotland, provided One Hundred Sovereigns, including the Premium, shall be offered at the Show, or within two months after it.

§ IV. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

II. For the best Sow—Five Sovereigns.

§ V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in any one lot five Cattle or ten Sheep, and for Implements, Roots, Seeds, &c., premiums will be awarded and apportioned by the Committee and Judges, in money, plate, or honorary medals, to the value in whole of Fifty Sovereigns.

MEMORANDUM REGARDING SWEEPSTAKES.

Lists for Sweepstakes will be made up in due time for those Classes of Stock which may appear most likely to meet the views of Exhibitors on both sides of the Tweed. In the mean time, nominations may be made to the Secretary of the Society at Edinburgh, or to George Jerdan, Esq. Secretary of the Union Agricultural Society at Kelso.

GENERAL REGULATIONS FOR THE SHOW.

1. The Competition will take place at Kelso, on Thursday the 4th of October next.

2. The name, residence, and post-town of the Exhibitor, the name of the Breed, the number of the Class in which the Animals are to be exhibited, their age, and, in the case of Fat Stock, the kind of food on which they have been fed, must be regularly certified, and the Certificate signed by the Exhibitor, agreeably to the form annexed, must be duly lodged, as required by Article 3d.—The name and residence of the Breeder, and the Pedigree of the Stock, as far as known, must also be given.

3. The certificates must be lodged with the Secretary before twelve o'clock on Friday the 28th of September, at which time a list will be made up by him; and no Stock will be allowed to enter into competition, or to be shown, which is not included in that list. *Printed forms* of Certificates may be had on application at the Society's Hall, No. 6, Albion Place, Edinburgh, or at Mr Jerdan's Office in Kelso. On or before Thursday the 27th of September, the Secretary will be at Kelso, to answer inquiries, attend to details, and to receive certificates. In the mean time, certificates may be lodged with him at Edinburgh, or with Mr Jerdan at Kelso.

4. A responsible person, on the part of the Exhibitor, must attend when the certificates are lodged, to give explanation, if it should be necessary, and receive instructions as to matters of detail at the Exhibition. The person or persons so attending must be acquainted with the various particulars required to be certified regarding the Stock of which they are in charge, more especially the mode of feeding in the case of Fat Stock; and it shall be competent to the Committee to require the Exhibitor, or the person in charge of the Stock, to confirm the certificates upon oath on the day of competition, in such cases as they think necessary.

5. A ticket or order will be delivered by the Secretary to the person in charge of each lot, for its being received into the Show Yard; and no Stock whatever can come within the premises without such warrant. One servant only for each lot can be admitted, and who must afterwards continue in charge of that lot in the Show Yard.

Bulls must be secured by a ring or screw in the nose, with a chain or rope attached, otherwise they cannot be admitted into the Show Yard. There are screws for temporary use, which competitors will find it convenient to provide for bulls that have not been usually ringed.

6. The Stock exhibited for the Premiums are to be fed solely on farm produce, including oil-cake,—but excluding distillery wash and grains, as being accessible only to a few competitors. If oil-cake has been used, the quantity is to be stated in the certificate.

7. The distance each Ox travels to the Show, and the date of being put to fatten, to be mentioned.

8. A competitor may show more than one lot in any class, but shall not gain more than one Premium for Stock in the same class. It shall not be competent to enter a lot in one class, and afterwards to withdraw it for competition in another class, unless by directions of the Committee. An animal having already gained the first premium in his class, at any of the Society's General Shows of Stock, which have been held at Edinburgh, Glasgow, Perth, Dumfries, or Inverness, is not to be shewn again in competition in the same class, but may be exhibited as Extra Stock, or entered for Sweepstakes.

9. Gentlemen intending to exhibit Extra Stock, must intimate to the Secretary, and describe the Stock to be shewn, six days before the competition. Sweepstakes to be reported in due time, in order that proper Judges may be appointed, and other necessary arrangements made.

10. The Stock exhibited will not be distinguished in the show Yard by the name of the breeder, feeder, or owner (until after the premiums are decided), but by *tickets* or *numbers* to be affixed to each lot, corresponding to the list to be made up by the Secretary.

11. The Committee of the Society appointed to conduct the arrangements for the Show, will appoint skilful persons to act as Judges for the several classes, and to report to the Committee the lots, which, in their opinion, are entitled to premiums. In forming their opinion, the Judges will have regard to the instructions to be delivered for their guidance, and particularly to symmetry, size, early maturity, purity, and general qualities characteristic of the different breeds they have to judge of, making due allowance for age, feeding, and circumstances peculiar to the cases which come before him.

12. The Committee of the Society, and the Judges to be named by them, will begin to view the Stock on the morning of the Show, at ten o'clock precisely; and the usual time will be allowed to the Judges for examining the Stock and forming their opinion, before the admission of any person, except a servant in the charge of each lot. To prevent confusion, the different lots must be brought to the ground, at or before eight o'clock in the morning.

CLASS X.

GENERAL SHOW OF LIVE STOCK,

AND

AGRICULTURAL MEETING AT STIRLING IN 1833.

The Society having resolved to hold the General Show of Live Stock and Agricultural Meeting for 1833 at Stirling, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Local Agricultural Associations, and from the noblemen and gentlemen of the counties more immediately connected with the Show:—

§ I. CATTLE.

SHORT-HORN BREED.

CLASS I. For the best Bull of the pure short-horn breed, not exceeding four years old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the above Premiums, that the Exhibitor shall let out the Bull for season 1834, to serve in a district including a circuit of thirty miles round Stirling, provided L. 60, including the Premium gained, is offered, together with the expense of conveyance to and from the hirer's residence, and the keeping of the Bull for the season.

II. For the best Cow, of the pure short-horn breed, of any age—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

III. For the best Heifer of the same breed, calved after 1st January 1831—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

IV. For the best two Steers, of the short-horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1831—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

V. For the best two Oxen of the short-horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1830—Fifteen Sovereigns.

VI. For the best two Oxen of the short-horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1830, and fed exclusively upon farm produce—Ten Sovereigns.

POLLED BREED.

VII. For the best two Oxen of any polled breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

AYRSHIRE BREED.

VIII. For the best Bull of the pure Ayrshire breed, not exceeding four years old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the Premiums in Class VIII. that the Exhibitor shall let out the Bull for season 1834, to serve as specified in Class I., provided a hire of L. 20 be offered, in addition to the Premium gained, with the expense of conveyance and keep.

IX. For the best Cow of the same breed, of any age—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

X. For the best two Heifers of the same breed, calved after 1st January 1831—Ten Sovereigns.

For the Second best ditto—Seven Sovereigns.

XI. For the best two Oxen of the pure Ayrshire breed, shewing most symmetry, fat, and weight, calved after 1st January 1830—Ten Sovereigns.

XII. For the best two Oxen of the pure Ayrshire breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Ten Sovereigns.

WEST HIGHLAND BREED.

XIII. For the best Bull of the pure West Highland breed, not exceeding five years old—Twenty Sovereigns.

For the second best—Ten Sovereigns.

A condition similar to that in Class 8th, is attached to the Premiums in Class XIII.

XIV. For the best Cow of the pure West Highland breed, of any age—Ten Sovereigns.

For the second best—Seven Sovereigns.

XV. For the best two Heifers of the same breed, calved after 1st January 1830—Ten Sovereigns.

For the second best—Seven Sovereigns.

XVI. For the best two Oxen of the pure West Highland breed, shewing most symmetry, fat, and weight—Fifteen Sovereigns.

For the second best—Ten Sovereigns.

XVII. For the best two Oxen of the pure West Highland breed, calved after the 1st January 1829—Ten Sovereigns.

XVIII. For the best two Oxen of the pure West Highland breed, calved after 1st January 1830, which have been bred by the Competitor, and have been fed exclusively on pasture during the summer and harvest preceding the Show—Ten Sovereigns.

For the second best—Seven Sovereigns.

FIFE BREED.

XIX. For the best two Oxen of the Fife Breed, not exceeding five years old, and shewing most symmetry, fat, and weight—Ten Sovereigns.

ABERDEENSHIRE HORNED BREED.

XX. For the best two Oxen of the Aberdeenshire horned breed, not exceeding five years old—Ten Sovereigns.

ANY BREED.

XXI. For the best Ox of any breed, pure or cross, shewing most symmetry, fat, and weight—Ten Sovereigns.

XXII. For the best Ox of any breed, pure or cross, fed exclusively on farm produce—Ten Sovereigns.

§ II. SHEEP.

BLACK-FACED BREED.

CLASS I. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

II. For the best pen of five Ewes, not exceeding five years old, selected from a hirsle of a regular breeding stock, not fewer than 100, and the pen having reared lambs for the season, to the 1st of July—Five Sovereigns.

III. For the best pen of five Gimmers—Five Sovereigns.

IV. For the best pen of five Wedders of any age, shewing most symmetry, fat, and weight—Five Sovereigns.

CHEVIOT BREED.

V. For the two best Tups of the Cheviot breed, not exceeding forty-five months old—Five Sovereigns.

VI. For the best pen of five Ewes, not exceeding five years old, selected from a hirsel of a regular breeding stock, not fewer than 100, and the pen having reared lambs for the season to the 1st of July—Five Sovereigns.

VII. For the best pen of five Gimmers—Five Sovereigns.

VIII. For the best pen of five Wedders of any age, shewing most symmetry, fat, and weight—Five Sovereigns.

LEICESTER BREED.

IX. For the best Tup of the improved Leicester breed—Five Sovereigns.

X. For the best two Ewes, not exceeding four years old—Five Sovereigns.

CROSS BREED.

XI. For the best pen of five fat Wedders, cross of a Leicester Ram and black-faced Ewe—Five Sovereigns.

XII. For the best pen of five fat Wedders of any other cross, the cross being specified in the certificate—Five Sovereigns.

§ III. HORSES.

CLASS I. For the best Stallion for the improvement of the breed of Draught Horses, not exceeding eight years old—Twenty Sovereigns.

It is a condition attached to this Premium, that the Exhibitor shall be obliged to let out the Horse for season 1834, to serve in a district including a circuit of thirty miles round Stirling, provided Seventy sovereigns, including the Premium, shall be offered at the Show, or within two months after it.

II. For the best breeding Mare for agricultural purposes, having had at least one foal, and not being under six, nor exceeding twelve years old—Ten Sovereigns.

III. For the best Stallion of the Cleveland breed, not exceeding eight years old—Twenty Sovereigns.

The Exhibitor shall be obliged to let out the Prize Horse for season 1834, to serve in a district including a circuit of thirty miles round Stirling, provided one hundred sovereigns, including the Premium, shall be offered at the Show, or within two months after it.

§ IV. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

II. For the best Sow—Five Sovereigns.

III. For the best three Pigs, not exceeding forty weeks old—Five Sovereigns.

In awarding the Premiums for this description of stock, attention will be paid to the breeds most suitable for being reared and fed for family use. The name of the breed to be specified in the certificate.

§ V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in one lot five Cattle or ten Sheep, and for Implements, Roots, and Seeds, &c., Premiums will be awarded and apportioned by the Committee and Judges in Money, Plate, or Honorary Medals, to the value in whole of Fifty Sovereigns.

MEMORANDUM REGARDING SWEEPSTAKES.

Lists for Sweepstakes will be made up in due time for those Classes of Stock which may appear most likely to meet the views of Exhibitors. In the mean time, nominations may be made to the Secretary of the Society at Edinburgh, or to Mr Robert Campbell at Stirling, the Clerk and Treasurer to the Local Committee.

GENERAL REGULATIONS FOR THE SHOW.

The Competition will take place at Stirling in the week immediately preceding the great Falkirk Tryst in October 1833.

The Competition in Classes II. III. IV. V. and XXI. is open to Cattle fed on distillery produce. Cattle so fed are excluded from competing in all the other Classes, but may be shown as extra stock.

Cows exhibited for the Premiums in Classes II. IX. and XIV. must have had a calf during the spring or summer preceding the Show, and the Heifers must not be shown in calf.

It is not required as a condition that any of the following descriptions of Stock, viz Bulls, Cows, or Heifers, of the short-horn breed, entire Horses, Mares, Boars, and Sows, Leicester Rams and Ewes, shall have been bred in Scotland, provided they

shall *bona fide* be the property of an Exhibitor in Scotland, from 1st of March 1833. All other descriptions of Stock (extra Stock excepted) must have been bred in Scotland.

Finally, the usual Regulations of the Society with respect to General Shows of this kind, in so far as applicable to the Stirling meeting, and which will be published in due time, must be strictly adhered to.

THE VETERINARY SCHOOL.

This Establishment is now in its ninth session, under the Lecturer appointed by the Society, Mr Dick, a Graduate of the Veterinary College of London. Students from various parts of the country have received instruction in the anatomy and diseases of the horse, and other domestic animals, in the best system of treatment and cure, in stable management, and in the most approved and scientific modes of shoeing; several of these students have been sent to attend the class by Local Agricultural Associations, and others have attended on their own account. The hour of Lecture is accommodated to the convenience of students attending the Agricultural and other Classes in the University.—Those students who attend two courses, and are afterwards found qualified at the annual examination by the Committee of Medical Examinators, receive Certificates.

Mr Dick occasionally delivers a Popular Course of Lectures to a class of gentlemen. The usual hour for the Popular Course is three o'clock afternoon.

The Lectures and Demonstrations for the Session 1832–1833, will be commenced in November next, at the usual Lecture-room in Edinburgh.

By order of the Directors,

CHARLES GORDON, *Dep. Secretary.*

